DOCUMENT RESUME

ED 240 253 CE 037 912

AUTHOR	Perraton, Hilary; And Others
TITLE	Basic Education and Agricultural Extension. Costs, Effects, and Alternatives. World Bank Staff Working Papers Number 564.
INSTITUTION	World Bank, Washington, D. C.
REPORT NO	ISBN-O-8213-0176-4
PUB DATE	Apr 83
NOTE	297p.
AVAILABLE FROM	World Bank Publications, P.O. Box 37525, Washington, DC 20013.
PUB TYPE	Collected Works - General (020) -- Information Analyses (070) -- Reports - Research/Technical (143)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Adult Basic Education; Adult Farmer Education; Agricultural Education; Case Studies; Comparative Analysis; Correspondence Study; Cost Effectiveness; *Developing Nations; Educational Radio; *Mass Media; *Program Effectiveness; Program Evaluation; Rural Education; *Rural Extension
IDENTIFIERS	*Africa

ABSTRACT

The five papers in this volume examine the methods, costs, and effects of traditional agricultural extension services and basic education and about the use of mass media for extension and education. The first paper, a literature review regarding the effectiveness of agricultural extension, reports that extension agents' studies of internal efficiency have been generally critical, while evaluators of external efficiency, mainly economists, show much more positive results. It is suggested that extension agents often have irrelevant evaluation criteria and economists generally overestimate the specific impact of extension services. The second paper reviews the literature on the comparative value of mass media and traditional approaches. Emphasis is on ways in which mass media have been used for agricultural extension and for basic education, ways in which mass media have been linked with group and individual study, and the costs of mass media as compared with alternatives. The remaining three papers discuss three different approaches to using mass media for rural education. These case studies focus on a government department, the Extension Aids Service of the Ministry of Agriculture of Malawi; a nongovernmental organization, INADES-Formation in West Africa; and a semigovernmental agency, the Lesotho Distance Teaching Centre. (YLB)

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ED240253

WORLD BANK STAFF WORKING PAPERS
Number 564

Basic Education and Agricultural Extension

Costs, Effects, and Alternatives

Hilary Perraton
Dean T. Jamison
Janet Jenkins
François Orivel
Laurence Wolff

CE035912

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Washington, D.C. 20433, U.S.A.

First printing April 1983
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Hilary Perraton is codirector and Janet Jenkins is director of the International Extension College, Cambridge, England; François Orivel is with the Institut de Recherche sur l'Economie de l'Education in the University of Dijon, France; Dean T. Jamison is senior projects officer in the Population, Health, and Nutrition Department and Laurence Wolff an education planner in the Eastern Africa Regional Office, both at the World Bank.

Library of Congress Cataloging in Publication Data
Main entry under title:

Basic education and agricultural extension.

(World Bank staff working papers ; no. 564)
Bibliography: p.
1. Agricultural extension work--Addresses, essays, lectures. 2. Mass media in agricultural extension work--Addresses, essays, lectures. 3. Basic education--Addresses, essays, lectures. 4. Farmers--Education--Addresses, essays, lectures. 5. Mass media in agricultural extension work--Africa--Case studies--Addresses, essays, lectures. I. Perraton, H. D.
II. Series.
S544.B27 1983 630'.7'15 83-5903
ISBN 0-8213-0176-4

ABSTRACT

The papers in this volume examine the evidence about the methods, costs and effects of agricultural extension and basic education and about the use of mass media for extension and education. The first two papers review the literature on the effectiveness of agricultural extension and on the use of mass media. Three case studies follow. All are of institutions which have used mass media, but in widely different ways. They are the Agricultural Information Service of the Ministry of Agriculture in Malawi, the non-government organisation INADES-Formation in West Africa, and the Lesotho Distance Teaching Centre.

CONTENTS

OVERVIEW	ORTHODOX AND UNCONVENTIONAL APPROACHES TO EXTENSION ... Hilary Perraton	iii
I	THE IMPACT OF AGRICULTURAL EXTENSION SERVICES: A REVIEW OF THE LITERATURE ..... Francois Orivel	1
II	MASS MEDIA, BASIC EDUCATION AND AGRICULTURAL EXTENSION ..... Hilary Perraton	59
III	MASS MEDIA FOR AGRICULTURAL EXTENSION IN MALAWI ..... Hilary Perraton, Dean Jamison and Francois Orivel	147
IV	TRAINING FARMERS BY CORRESPONDENCE IN CAMEROON ..... Janet Jenkins and Hilary Perraton	203
V	THE LESOTHO DISTANCE TEACHING CENTRE ..... Laurence Wolff	249

OVERVIEW

ORTHODOX AND UNCONVENTIONAL APPROACHES TO EXTENSION

This set of papers addresses a single theme: how effective are the traditional methods of agricultural extension and basic education and of what value are alternative approaches using the mass media?

The papers have two points of origin within the Bank. First, they derive from the studies, reported by Jamison and Lau (1982) on the effect which the background education of farmers has on their farming practice. These showed a positive, significant, and consistent relationship between farmers' educational level and the management of their farms, but left more open questions about the relations between extension and farm management or productivity. The second line of research derives from studies of the use of radio for education. These showed that radio could be a cost-effective way of providing or supporting formal education (Spain, Jamison and McAnany 1977). That finding in turn provoked questions about the value of radio and other mass media for nonformal education and extension.

These issues are examined in two ways. The first two papers review the literature on the effectiveness of agricultural extension and on the comparative value of mass media and traditional approaches. The remaining three papers are case studies on the use of mass media in Malawi, Cameroon, and Lesotho.

What the papers say

Orivel's review of the effectiveness of agricultural extension begins by summarising the development of extension work in the third world. The evaluation of this is complicated by problems of timing, where some effects of extension may be long delayed, and problems of objectives. Many research workers have wanted to look both at the impact of extension services on agricultural efficiency or production and on the effects of extension on equity.

Studies of the internal efficiency of agricultural extension services have generally produced critical findings. Extension agents have often contacted only a minority of farmers and have tended to contact those who are richer and better educated. A number of reasons for these weaknesses have been identified. They include the, often unfavourable, ratio of agents to farmers; the inadequate training of extension agents; their location, which may make it difficult to visit farmers; their pay; and uncertainty about their role and the variety of functions they may be asked to undertake. Orivel concludes that, while such internal evaluations are generally pessimistic, they often leave out of account the external impact of extension work and have rarely attempted to measure its effect on yields or income.

Next the paper examines the studies of the external effects of extension. Four kinds of studies are identified, using measures of internal rate of return, correlations at regional level, comparisons of yields and micro-

economic production functions. Orivel looks at all four but stresses the methodological difficulties in the first two where results in terms of increased production cannot easily be ascribed to causes. Similarly, where yields are compared before or after the introduction of an extension service, or between regions with and without an extension service, it is not possible to attribute yields specifically to the extension service. Taking these weaknesses into account, it is still striking that most external studies of these three kinds do show positive results for extension. Finally Orivel examines twenty-one studies focusing on individual farms as the unit of observation which do make this kind of analysis possible. Nine of these studies produced significant positive correlations between contact with extension and productivity, eight found positive but statistically insignificant correlations, three found insignificant negative correlations and one found a significant negative correlation.

Orivel argues that the first three methods tend to overemphasise the effectiveness of extension, by attributing all increases in production to it rather than to other factors, while the fourth tends to underemphasise its effectiveness, by failing to allow for the effects of diffusion. He concludes by arguing for further research on the relations between the educational level of farmers and their use of extension services and on the best vehicles for distributing information.

The main emphasis of the next paper is not on traditional methods of agricultural extension but on the ways in which mass media have been used for similar purposes and for basic education. In order to place that discussion in context, it first examines the different philosophies of agricultural extension and of basic education projects, and looks at the evidence on the effectiveness of agricultural extension, parallel to the discussion in Orivel's paper, and of adult literacy programmes as an example of basic education. Perraton argues that traditional methods of basic education, as exemplified by literacy teaching, have been neither particularly successful nor particularly cheap.

The main part of the paper discusses the use which has been made of mass media for rural education. It examines in detail ways in which mass media have been linked with group study through institutions like the radio schools of Latin America, farm forums in Africa and Asia, and short radio campaigns in Botswana and Tanzania. It also examines the use of mass media, using both radio and print, aimed at individuals rather than groups. Next the paper brings together evidence from existing studies on the costs of mass media as compared with alternatives. Radio schools in Latin America, which teach the equivalent of the primary school curriculum but to adults, have done so at a cost per head of between (1978) US$30 and 65 a year. It seems that radio campaigns in Tanzania, which reached audiences of between two and three million participants, cost between $1 and $5 per head for a campaign of two to three months. A significant part of the cost of either kind of scheme is the arrangement for group discussion and for feedback. The cost of radio programmes, without arrangements for group learning or organised feedback from listeners, compares favourably with most other methods of distributing information. Evidence from Malawi suggests that the cost of a one hour contact between a radio programme and a farmer is only 1/3000 of the cost of a face-to-face contact with an extension agent.

The remaining three papers discuss, in much more detail, three different approaches to using mass media for rural education.

The first is of a government department - The Extension Aids Service of the Ministry of Agriculture of Malawi. The Service has four major activities: producing and distributing publications, running a fleet of mobile vans which show films and puppet plays, broadcasting regular radio programmes, and running an evaluation unit which monitors the Branch's work. The Extension Aids Branch costs about 10% of the total national expenditure on agricultural extension. The paper discusses the organisation of the Extension Aids Branch, as it was at the time of the study, and its relation to the rest of the extension service. It then reviews the evidence on the effects of different sources of agricultural information, which are consistent in reporting that farmers learn both from film and from radio, although they do not establish a causal link between exposure to mass media and increased agricultural production.

The authors then discuss in detail the cost of using mass media and compare these with the costs of other ways of reaching farmers. Costs are calculated for various kinds of contact between farmers and extension services. These show that it costs about $21 to arrange a single contact between an extension agent and a farmer; about $4-5 a day for a farmer to attend a training centre; about $0.17 per farmer contact hour when a farmer sees one of the Branch's mobile films; and about $0.004 per listener hour for radio.

The second case study discusses the work of a non-government organisation, INADES-formation. This was founded by Jesuits in West Africa to promote African development and has been using correspondence courses to train farmers and extension agents since 1962. Its headquarters is in the Ivory Coast but it has separate national offices in some ten African countries. Within Cameroon, where the case study was carried out, it has four separate regional offices.

In Cameroon INADES-formation distributes and teaches correspondence courses, runs one-day seminars, and plays a small part in contibuting to government broadcasting on agriculture. The courses are, for the most part, prepared in the Ivory Coast for use throughout the countries where INADES-formation operates but are in some cases adapted by national or regional offices. Farmers following the courses send correspondence work to a regional office where it is marked. For the most part they study individually and INADES-formation has had only limited success in organising group study. The courses do not lead to any formal qualification and are, in practice, effectively limited to literate students. The students are about evenly divided between peasant farmers and extension agents. In some parts of Cameroon the successful completion of INADES-formation courses is a requirement for promotion as an extension agent.

There is only limited evidence on the effectiveness of INADES-formation. It reaches a very small proportion of the population but what evidence there is suggests that farmers do learn both better farming practices and the reasons for them from their courses. Two studies showed evidence of changes in farming practice, where local circumstances allowed this, and gains in knowledge for those following INADES courses.

The paper analyses the cost of enrolling on correspondence courses and found that the cost per student in 1979 was $224. A comparative study of the costs of INADES-formation in Rwanda showed that there were considerable potential economies of scale as the Rwanda cost per student was $92.

The paper concludes by suggesting that an important future role for INADES-formation, and one which is probably highly cost effective, is in the training of extension agents rather than the teaching of peasant farmers directly.

The final paper discusses the work of the Lesotho Distance Teaching Centre, which was established as a semi-government agency in 1974. Unlike the institutions described in the two previous parts, the Centre is concerned with a variety of different educational activities and not solely with non-formal or agricultural education. It provides, for example, correspondence courses at secondary level, and for trainee teachers, as well as teaching practical skills to rural people, promoting basic literacy, and helping other agencies working in nonformal education. A combination of factors, including relatively high literacy and poor radio reception conditions in the mountainous two-thirds of the country, have led the Centre to concentrate on the distribution of printed materials for rural education. It has produced a range of printed pamphlets designed to help rural adults acquire practical skills.

On the basis of a study carried out by the Centre in 1977, Wolff analyses the production and distribution costs of one pamphlet on how to crochet. The unit cost of producing and distributing this amounted to about $0.65 per copy. There is evidence that the pamphlet was effective in teaching people to crochet or enabling them to crochet better. This makes it possible to estimate a rate of return for buyers of the pamphlets and to show that this is high both for individuals and for society.

What we know and don't know

We can draw four conclusions from these papers.

First, the evidence on extension services is mixed. While existing services are properly criticised on grounds of internal efficeincy and equity, the evidence on extenal efficiency suggests that they are more likely to have a favourable benefit:cost ratio than the reverse. However, budgetary limits make it difficult for extension services to expand so that they reach all farmers.

The evidence on the use of mass media is also mixed and, as with orthodox extension, at our present state of knowledge it is seldom possible to attribute results in terms of better agriculture or increased productivity directly to contact with the mass media.

There is, however, some evidence of the effectiveness of mass media and clear evidence that they can provide contact between providers of agricultural information and farmers at costs far lower than are possible for orthodox extension agencies. This suggests that there is a case for expanding and improving the use of mass media, both as a support to extension services, and as a way of reaching farmers, including women

farmers, whom the extension agents do not meet.

There remains much that we do not know, and on which research would be valuable, about the modalities of using mass media, about the best ways of combining different media and about ways of linking mass media with extension services.

Hilary Perraton October 1982

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PART I

THE IMPACT OF AGRICULTURAL EXTENSION: A REVIEW OF THE LITERATURE

Francois Orivel

Table of Contents

		Page No.
	AN OVERVIEW	3
	INTRODUCTION	4
I.	GENERAL PROBLEMS	5
	(1) Objectives of extension services	5
	(2) The context	7
	(3) The time factor	8
	(4) Ideology	10
II.	INTERNAL EVALUATION OF AGRICULTURAL EXTENSION SERVICES	14
	(1) The underlying philosophies of agricultural extension projects	14
	(2) Evaluation of the internal effeciveness of agricultural extension services	16
	Conclusion	31
III.	EXTERNAL EVALUATION OF AGRICULTURAL EXTENSION SERVICES	32
	(1) Methods	33
	(2) Results	33
	Conclusion	48
	Bibliography	52

AN OVERVIEW

This paper provides a review of the literature on the effectiveness of agricultural extension services worldwide. It shows that evaluators of the internal effectiveness of extension services are generally critical; they claim that extension services have poor performance, reach only a small proportion of farmers (those who are better off), have wrong objectives, and are of little help to the agricultural sector as a whole. The author argues that this diagnosis may be excessive, that evaluators often have irrelevant evaluation criteria, and that historically the situation has substantially improved. Evaluators of external efficiency, mainly economists, show much more positive results. Those who use aggregate data find high social rates of return to investment in extension services and high correlations between extension services and agricultural productivity, but the methods used tend to overestimate the specific impact of extension services. Those who use farm-level data obtain mixed results, about half with significantly positive regression coefficients but of low value, and the other half with nonsignificant regression coefficients.

INTRODUCTION

The purpose of this survey is to take a comprehensive view of the available information on the impact of agricultural extension services worldwide. Its aim is to provide decision-makers with a body of facts and reflections that can assist them in establishing rural development strategies which, in the light of their priorities and financial constraints, will produce the best results.

The present review continues the study by Lockheed, Jamison and Lau (1980) on the effects of the educational level of farmers on the management of their farms, which demonstrated a positive, significant, and consistent relationship. The findings of our study are less conclusive, however, in that many of the evaluations of the impact of extension services reveal negligible, or even negative, effects.

Another difference from the above-mentioned study is that evaluations and analyses of the impact of agricultural extension services have been more concerned with their effects on equity than have studies of the impact of education. When agricultural extension services are introduced in a poor region, both gross and net agricultural production in the region often increase significantly and the economic value of this increase is greater than the cost of the extension services, while at the same time the disparities between farmers are intensified between the minority who benefit from the extension services and those who do not.

There are probably similar negative effects, in terms of equity, in education (disparities between educated and non-educated farmers), but the analysts are not looking at things from the same angle. For the extension services, the comparison is between farmers who are now receiving extension services and other farmers who might possibly, but do not yet, receive such

services. In education, the comparison is between farmers who in the past attended, or did not attend, school and the emphasis is no longer on the reasons for the inequality of access to education.

Evaluations made by economists are concerned principally with the effects of extension services on production, productivity and income. Evaluations conducted by sociologists, educators and communication specialists are primarily concerned with the problems of the organization of extension services (internal efficiency) and of distribution and equity. Sections II and III of this study deal with these two different types of evaluation and their findings. The first section is devoted to certain problems common to both, viz. objectives, context, the time factor, and ideology.

I. GENERAL PROBLEMS

(1) Objectives of extension services

The primary objective of agricultural extension work has long been the dissemination of innovations to increase productivity (cultivation methods, mechanization, new varieties, use of fertilizer, irrigation, new crops, etc.). The aim has been to move from the traditional type of farming, characterized by a small volume of trade (limited purchase of products outside the agricultural sector, limited sales of agricultural products to other sectors), to a new type of agriculture with strong links to the economy as a whole. This is the extension service model that has been an institution for the past 100 years in the industrialized countries.

The introduction of this system into the developing countries during the last thirty years has encountered quite a different set of circumstances. The agricultural sector in these countries still includes a large proportion of the working population. Potential exchanges with the

other sectors are necessarily limited, since these other sectors exist only in an embryonic state. The extension services have therefore turned their attention towards promoting export crops.

The outcome of extension services has been a source of much disillusionment. The market prices of agricultural exports have fluctuated considerably and have generally remained low. Export crops have often been developed at the expense of subsistence crops, sometimes leading to food shortages among peasant families. In other words, the innovations have not been without cost and the corresponding benefits have not necessarily gone to those who have borne this cost.

These problems have led to the definition of new objectives and new goals for agricultural extension services. In the 1960s, and more markedly in the 1970s, the extension services have gradually come to concern themselves with subsistence agriculture and with problems of distribution and equity.

This new approach presents a formidable challenge to the extension services, since one may well ask whether it can ever be achieved, particularly where the question of equity is concerned. In traditional peasant societies where there have been few disparities, it is difficult for any intervention by the extension services to avoid disequalizing effects; even where these services reach all the farmers and provide appropriate advice, they cannot guarantee that all will benefit equally from their advice nor can they force reluctant farmers to follow this advice. An evaluation made after the lapse of a few years of extension activity will almost inevitably reveal increased disparities among farmers.

Where there are already marked disparities, the extension services, even if concentrated on the most disadvantaged, can hardly prevent the better-off farmers from taking better advantage of the services (because they

generally possess, on the average, more land, more capital and more education).

The objective of strict equality among farmers does not necessarily lead to a general development process, which requires the expansion of non-agricultural sectors. This expansion requires a transfer of labour from the agricultural sector to other sectors, and an increase of productivity by the remaining farmers to feed people working in other sectors. It may be that more equality among poor farmers hinders the necessary mobility from the agricultural sector to other sectors. From a larger equity perspective, temporary inequality among farmers may accelerate the development process.

It must not be forgotten that in the developed countries, in recent decades, the achievement of parity of income between farmers and other social categories only became possible when the agricultural sector came to account for less than 10% of the working population, when the birth rate among rural families fell to the national average, and when agriculture became capital-intensive.

Rural development, more equal income distribution, and the fight against rural poverty in the Third World, are not strictly agricultural issues. It must be integrated in a wider development perspective where labor mobility is encouraged and not considered a negative outcome.

(2) The context

The introduction of agricultural extension services is one factor among others that can promote increases in agricultural productivity. Where a combination of favorable factors already exists and only a catalyst is lacking, the project may have spectacular results. Conversely, in a situation where everything is lacking (land, capital, suitable seeds, fertilizer, water, distribution and storage arrangements, markets, etc.), an extension service,

however well organized, cannot work miracles. If, in addition, it suffers from weaknesses itself (lack of qualified staff, lack of motivation, lack of the means of transport and of political support, etc.), then the impact will almost certainly be negligible. The problem is thus less one of showing whether agricultural extension services can have an impact, positive or otherwise, than of determining under what conditions a particular extension project has a reasonable chance of success.

(3) The time factor

Agricultural extension services act by disseminating information. The information is presumed to be of use in increasing agricultural productivity. Extension services are not the only means of disseminating this information; there are other vehicles such as specialized periodicals, radio, television, training courses, the example of other farmers, organized visits by farmers, membership in professional associations, etc. If extension services are introduced, it is because they are assumed to be a rapid and effective means of disseminating such information and ensuring that it is put to use. It is a means of gaining time.

In the 1960s certain economists like Schultz (1964 and 1966) postulated rational economic behavior on the part of the traditional peasant, whereas sociologists like Rogers (1966) saw the traditional peasant as an individual whose behavior was determined by non-economic factors. Rogers drew up a list of character traits that represent the cultural heritage of peasant societies: mutual distrust, lack of inventiveness, fatalism, a low level of expectation, lack of understanding of deferred advantage, a limited horizon, strong family dependency, parochialism, and a lack of empathy. In support of his description of traditional peasant behavior, Rogers quotes studies by Nair (1962): "The lower the level, the more static the aspirations tend to be,"

and Rosen (1964): "Where poverty is widespread and opportunity for advancement very limited ..., the belief that the individual has little control over his environment is perhaps inevitable and probably psychologically functional."

These two analyses are not contradictory. When Schultz observes the economically-rational behavior of traditional farmers, he is not assuming that there are not obstacles, but that the socio-psychological obstacles analyzed by Rogers and others can be overcome when a better environment, adequate infrastructures, and appropriate economic incentives are provided. Schultz also has a longer time perspective and knows that sometimes several generations are necessary to take advantage of certain innovations (Schultz, 1966).

It is true that in most cases the evaluation of rural development projects calling for the widespread use of innovative methods is conducted after too short a lapse of time for the benefits of the project to be seen in the case of the majority of farmers. If it takes 20 or 30 years for an innovation to become widely adopted, as in the examples quoted by Schultz, this is beyond the time horizon of decision makers or project evaluators.

As Cancian (1972) pointed out (quoted by Barlett (1980)): "The question whether Zinecanticos are economic maximizers or prisoners of tradition ... is a bogus question that leads to scientifically incorrect and politically dangerous descriptions of peasant societies."

Barlett adds that during the 1970s, "we have moved away from simple questions with yes or no answers and are now pursuing issues by seeking to determine when farmers behave as one would predict from strict maximization formulae and when they do not .... Our emphasis has moved beyond the consideraton of achieved versus ascribed characteristics of persons to a study

of relationships .... Such a perspective leads not only to a measurement of the diversity of behavior within rural communities but also to a clarification of, and sometimes to the measurement of, the variables that interact to produce the behavior outcome."

The key variables differ, according to the particular case: access to material and non-material resources, access to land and inheritance, access to water, etc. Barlett concludes that "in-depth studies give conclusive proof that simple solutions and worldwide verities are doomed to disappointment. Local realities will always distort the mathematical curves, and no simple model can hold up past class, kinship, ecological and governmental differences."

(4) Ideology

Rural development is a sensitive subject from the ideological viewpoint. Certain writers take a normative approach and indulge in a priori analyses which reveal that their value judgments are not in accordance with the project goals.

The major criticism addressed to rural development projects in Third World countries is their "western" character, on the grounds that:

- the projects are conceived along the lines of development modes experienced in the West;
- they are conceived by Western "experts";
- they are designed to promote the interests of the Western countries.

Although in the case of a few writers, the notion of "western" is opposed to "eastern", i.e. the development model promoted and illustrated by the countries of Eastern Europe, particularly the USSR (collectivization of agriculture and state farms), this is no longer true today of the majority of

the writers whose approach we have described as ideological. In fact, the "eastern" model has ceased to have any relevance since the results achieved in the domain of agriculture under this system have not been convincing, even in the eyes of its most ardent supporters.

Writers who belong to this ideological current nowadays contrast the "western" model with a rather confused model, which combines a clinging to the past, defense of traditional modes of life and production, ecology, opposition to the multi-national cooperations that control the world market for agricultural products, restrictions on trade with the West (domestically-oriented development), and an equal (or more equal) distribution of inputs and outputs.

The most brilliant advocate of this line of thought is the agronomist Rene Dumont (1962 and 1980) who has had extensive experience in the field and does not rely solely on a priori criticism, as do many of his followers.

The main thesis of these writers is that most of the rural development projects based on agricultural extension services are aimed at promoting the growing of crops intended for the commercial market, and primarily for the world market, and that these crops are developed at the expense of food crops. According to these writers, the beneficiaries of this system are therefore not the farmers, nor even the urban populations, but the governments which collect additional taxes, the commercial companies which make a profit, and the developed countries which obtain their supplies at low cost. It is argued that as a result, the farmers (and even ordinary urban people) and their families are increasingly ill-nourished. The phenomenon as a whole is described as "plundering the Third World". Cf. Dumont (1980). The root of the "evil" lies in the "industrialized society, which is bringing the

Third World even closer to starvation." (Dumont, 1980, page 31).

It is true that some rural development projects have had, and still have, a negative impact (especially some unwise cash-crop oriented projects). But now, they are improving and the generalization is no longer true. If one takes aggregate data, instead of examples or anecdotes, one finds exactly the opposite: the more a country increases its exchanges with industrialized countries, the more it achieves a high rate of growth and the more it improves the calorie intake of its people.

The food consumption data (cf. Annex, Table 1) reveal that in the so-called developing countries, between 1966 and 1977, daily per capita consumption of calories declined in four or five of the poorest countries (per capita income of less than $120); in 16 (i.e. 57%) of the 28 countries with per capita incomes between $130 and $360; in 6 (i.e. 23%) of the 26 countries with per capita incomes of between $390 and $1,050; and in 0% of the 29 countries with per capita incomes of $1,090-$3,500. In other words, the poorer the country the more likely that the food situation will deteriorate. Is this trend the result of "plundering" of the Third World, as claimed by these writers? If we look at the data on foreign trade 1/ we find that exports by the group of 38 low-income countries declined in volume at a median rate of 0.8% per year from 1970 to 1978, whereas exports by the group of 51 middle-income countries grew at a rate of 5.2% over the same period. Thus, the countries whose food situation improved are those who increase their exports the most. Further, the terms of trade index is somewhat more favorable to the low-income countries (98) than to those in the middle-income

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1/ Data taken from the World Development Report 1980, World Bank, Washington, D.C.

group (90) and even to the developed countries (95) for the same period 1970-1978; the only beneficiary group in terms of trade was the capital-surplus oil exporters (393).

It is difficult, on the basis of these data, to maintain the hypothesis of a cause-effect relationship between purchases of raw materials by the developed countries and the deterioration of the food situation in the developing countries. If we take specific examples, as do Berthelot and de Ravignan (1980), we find many agricultural development projects that have had adverse effects on the local population, but on a macro-economic level the cause and effect relationship does not stand up, and more recent projects, lessons of the past having been learnt, are increasingly able to avoid such pitfalls. An objective analysis of agricultural development projects sponsored by the World Bank, for example, reveals an increasing concern to prevent the unfortunate secondary effects observed in the past.

Payer (1979) posited as the real purpose of World Bank loans to small farmers as to persuade them to buy costly industrial supplies (to increase profits in these industries); to expand the technical assistance market (creating opportunities for "experts"); and to oblige farmers to pay taxes; such a statement, whether intended as ideological, polemic or simply naive, has no foundation in rigorous observation of facts.

To claim after this that the farmers are happier under a system of subsistence farming and that the agricultural extension services are an instrument of control leading to loss of freedom reflects a value judgment which is no less inspired by western ideas than is the mode of development denounced by Payer.

II. INTERNAL EVALUATION OF AGRICULTURAL EXTENSION SERVICES

As we noted in our introduction, the internal evaluation of agricultural extension services is dominated by sociologists, educators and communication specialists. It is principally concerned with the interaction between the extension services and the farmers with the obstacles to effective interaction, with underlying philosophies, and with the effectiveness of the extension services in disseminating innovations.

(1) The underlying philosophies of agricultural extension projects

As Malassis points out (1975), the agricultural extension services follow two principal models: the first, which he calls the "supervisory" system (vulgarisation par "encadrement") employs more or less directive methods imposed from above by technocrats, politicians and "leaders", whose aim is the achievement by farmers of a number of set targets. Active methods of persuasion are used but not coercion.

The second method, on the other hand, emphasizes participatory decision-making. In the French-speaking world it is known as animation, whereas in the Anglo-American literature the term "community development" is preferred, and in Hispanic contexts, the term "promotion".

It needs hardly be said that an overwhelming number of the writers, including Malassis himself, prefer the second formula. Moreover, although the majority of the extension projects undertaken in the Third World between 1950 and 1970 have only a minimal directive component, they are criticized by a majority of the evaluators for paying too little attention to the participation of the farmers themselves. It should be noted that in this respect Dumont, who in most other ways is regarded as a radical, argues that "democracy comes after development".

Paulo Freire (1973) goes so far as to take the view that, however

they are conceived, agricultural extension services are a tool for the "manipulation" of farmers, with all the pejorative implications that this has.

The paradox is that, in face of so much criticism, the only real effort made in the seventies to revitalize the agricultural extension services--Benor and Harrisson's "Training and Visit System" (1977)--embodies the most radical version of the supervisory system so far.

So far as participation by farmers is concerned--empirical evaluators having invariably found that there is too little--the concensus appears to be that the more there is of this, the better. However, to quote Oxenham and Chambers (1978):

> "Too little may lead to chaos
> Too much may end in inaction;"

or Jamison-McAnany (1978):

> "The non-directive nature of the animation approach
> can mean endless dialogue and little action."

In our view it is a question of determining the participatory input appropriate to the particular case rather than one of some arbitrary and absolute level of participation. Participation has a price in terms of time and transportation and, over and above a certain point, its impact is undoubtedly negative. Chambers and Oxenham, who are generally very much in favor of increasing the role of the farmers, nevertheless recognize that "representative" participation is frequently the only possible route to take in face of budgetary constraints.

Belloncle and Gentil (in Lele, 1977) report that in Cameroon the agricultural extension project has adopted a highly participatory approach and this appears to have been successful although, from the economic standpoint, the complete absence of any analysis of cost-effectiveness leaves the reader

in doubt. The vital question is therefore whether, faced with such budgetary constraints, it is better to involve 100 farmers in a highly participatory approach or 1,000 farmers under a supervisory extension system.

Ruthenberg (1973) is inclined to favor a third approach, which he describes as "contractual". It simply amounts to a contract between volunteer farmers and the development/extension service agency, under which the farmer agrees to follow instructions, and the agency, to provide him with technical assistance and market outlets. According to the author, this method has been employed successfully in a tea-growing project in Kenya and a tobacco-growing project in Tanzania. Ruthenberg believes that this formula is useful and effective in the case of the introduction of farming practices whose significance is not apparent to the farmer (with long-term implications, such as soil erosion).

Moris (1966), having seen the ineffectiveness of extension services in Kenya and Uganda, strongly recommends the solution of Farmer Training Colleges. Two surveys of 171 and 165 farmers trained in colleges in Kenya and Uganda respectively have shown that all the trainees improved their performance as a result. Here again we must object to Moris' conclusions on the grounds that they are not based on cost-benefit analysis. If, for the same budgetary funds, it is possible to train 100 farmers in colleges or assist 10,000 through an agricultural extension service, it is essential to determine the specific benefits attributable to each of these methods.

(2) Evaluation of the internal effectiveness of agricultural extension services

As we indicated earlier, the literature is extremely discouraging. Rice, for example (1971), who evaluated 13 agricultural extension projects financed with American aid in Latin America, concluded that they had all been failures. We shall now proceed to consider the criteria of effectiveness

adopted to determine success or failure, the difficulties identified by writers to explain the failures and, finally, the factors complementary to, and/or that could be substituted for, agricultural extension services.

(a) Criteria for effective performance

In general, the criteria for determining failure are of two types: either the extension service has contacted very few farmers in relation to the targets set, or those that have been contacted are not those to whom priority should have been given.

-- Coverage of farmers

Depending on the project, the number of farmers per extension agent varies between 100 and 2,000, but is between 500 and 1,000 in the great majority of cases. The evaluation reports calculate the proportion of this target actually covered by extension agents in a given year as well as the average number of contacts between agents and farmers. It is invariably found that only a minority in the farming community has had effective contacts with the agents and that those covered have been contacted less frequently than would be necessary to ensure the assimilation of all the new farming practices to be introduced. Giltrow and Potts (1978) estimate, in the case of a Nigerian project, that only 3% of the farmers have been in touch with extension agents.

Chambers and Wickremanayake (1977) report that surveys made in India and Sri Lanka have shown that the percentage of farmers covered has been relatively high (60% to 80%) but, according to them, these surveys must be subject to reservations as the regions in which they were organized are unrepresentative (more highly developed supervisory structure than on the average, unusually well-served villages, farmers more advanced than the average). Chambers, in correcting these samples, found that the percentages

of farmers actually covered were of the order of 16-21%.

Perraton, Jamison and Orivel (1981) have shown in a survey in Malawi that 11% of the farmers surveyed were in contact with the extension services where the services were "thin" and 30-60% where they had been reinforced.

In fact, the extension system needed to cover a large majority of the farmers on a regular basis would make extremely heavy budgetary demands. It has been found that, when a well-selected minority of farmers has been covered, there is a progressive dissemination of new farming methods amongst the others. Benor's Training and Visit System moreover exemplifies the institutional application of this process, since it is based on a network of "contact" farmers explicitly responsible for the spread of new methods amongst the others. This kind of approach should always be made sensitively for, as Belloncle and Gentil (1967) have shown in Cameroon, the criteria used to select such "contact" farmers are not always those that produce generally acceptable leaders. In this particular instance, the choice had been made on the basis of their knowledge of French, with the result that they were sometimes unacceptable to other members of the farming community.

-- Type of farmers reached by the extension services

These are not only a minority but they also tend to be among the better-off members of the farming community and therefore those who have the least need for extension services.

According to Chambers and Wickremanayake (1977), their holdings of land are above average (no data). Similarly, Lele (1977) reports that in the CADU project in Ethiopia, the farmers were on average more affluent (more land and livestock); more often than not they belonged to farmers' associations; they were better educated and younger.

Leonard states (1973) that 57% of extension agents' visits are made

to the most advanced 10% of the farmers and only 6% to the most traditional 47% of these. According to IDS (1978), the Green Revolution in India has strengthened the domination exercised by large farmers over small ones, since it is the former who have adopted the high-yield varieties, become relatively wealthy and been able to increase their holdings at the expense of poorer farmers.

Bhalla (1976) notes that, broadly speaking, the Green Revolution has had an unfavorable impact on the rural landless through an erosion in established clientele patterns (an elementary form of social protection) and a reduction in payments in kind.

Lenglet also argues (1980) that it is the more dynamic elements in the rural sector that make the most effective use of the inputs provided by the rural development services in the Ivory Coast.

Dubey (1962) has shown that it is in the interest of an extension agent to establish good relations with local persons of consequence (as their hostility could involve him in disputes with his own superiors) and therefore to give priority in his activities to locally dominant farmers.

On the other hand, Singh (1979), commenting on the training and visit system, observes that initial evaluations show favorable results in the case of small farmers with only 1 or 2 hectares.

Nevertheless, evaluation studies made shortly after the implementation of agricultural extension projects generally show that the initial beneficiaries are amongst those farmers who are least deprived. In the longer term, we can assume that the poorer farmers have finally adopted the innovations (as a result of dissemination and progressive assimilation) or that they have left (rural exodus). It is likely to be cheaper to persuade the more advanced and energetic farmers to adopt new methods of cultivation

and there may be a conflict between the goals of effectiveness and equity.

(b) Obstacles to the effectiveness of extension services

These fall into two categories: those that hinder the efficient internal operation of services, and those that prevent the introduction of innovations.

(i) Internal obstacles

Ratio of agents to farmers

When there are too many farmers to each agent, the effectiveness of the latter is reduced. On the other hand, increases in coverage are costly. The Benor system, which provides one agent for every 600 to 700 families, supported by farmers responsible for training other farmers, appears a good compromise from the economic standpoint. Many of the writers, however, recommend more active supervision (one agent for 150-200 farmers).

Training of extension agents

Inadequately trained extension agents are incapable of propagating needed innovations. They cannot answer the technical questions raised by farmers, nor can they deal with unforeseen situations (such as crop diseases). On the other hand, a very high level of training does not necessarily produce the best results.

Lele (1977) reports that, in Kenya, Leonard showed that extension agents with a secondary education were less capable of handling agricultural problems than those who had only completed primary school supplemented by agricultural upgrading courses, succeeded less well with the introduction of new cultivation methods, were less highly motivated in respect of agricultural extension projects and promoted urban scales of values.

Lele also indicates that Harrisson's findings in Nigeria were similar.

Location of extension agents

Many observers (more particularly Chambers) have pointed out that the further a village is from the place of residence of the extension agent, the less likely it is to be visited by him. Transportation problems are sometimes difficult to overcome. Travel is costly in terms of both time and money. If an extension agent is overloaded, he will tend to see more farmers close by than at a distance.

In some agricultural extension systems a group of extension agents resides in an office building located in the administrative center for the district. In others, they work on their own and are scattered amongst the villages for which they are responsible, visiting the head office periodically to keep in touch, obtain training, receive instructions and report on their work in the field.

In Lele's view (1977) the empirical studies that have been undertaken on this problem provide no clear answers. Lisenmayer and Agarwal have shown that in the Tanzanian tobacco-growing development project the results were better in the Tumbi region, where the extension agents lived in the villages, than in the Urambo region, where they lived in the administrative center.

On the other hand, Leonard found that in Kenya non-resident agents made more visits than resident agents, that they were more effectively controlled by their superiors than those who lived in isolation in the villages, and that those who stayed in villages were exposed to more tribal and family obligations.

Rahim (1966) describes the difficulties encountered by an agent

living in the village in a project in Pakistan. The villagers regard him with mistrust and suspicion. Living conditions in the village are difficult and austere. There is no health service, no education service and no decent lodging for himself and his family.

Hursh, Niels and Kerr (1968) also noted that, in Nigeria, the extension agents living in villages were too cut off from their superiors and very inactive.

Remuneration of extension agents

What level of remuneration is needed to obtain effective extension agents? Many observers report that wages are frequently low and provide an explanation for the lack of motivation and apathy of many agents. On the other hand, Belloncle and Gentil (1967) state that, in Cameroon, wages were high in relation to the level of earnings of the farmers for which they were responsible and that this disparity in earnings created a psychological barrier that made useful contacts more difficult.

Kabure (1979) evaluated the agricultural extension systems in six West African countries (Benin, Mali, Niger, Senegal, Togo, and Upper Volta) and concluded that under-remuneration of extension agents and failure to provide them with the means of transportation are the main cause of their lack of motivation and the rapid turnover of agents, with the consequent poor level of effectiveness.

De Vries (1976) made the original suggestion that there should be a link between the remuneration of extension agents and the results achieved by them. It therefore appears that so far as the training of agents, their place of residence, and level of remuneration is concerned, the experience so far obtained does not point to any obvious conclusions. In each case the answer appears to depend on the particular circumstances.

The nature of the role of the extension agents

There are two conflicting theories here. On the one hand, there are those who believe that an agent should concentrate his efforts on visits, advisory services and demonstrations and, on the other, those who think that he should act as a coordinator between the multiplicity of agencies and departments concerned with rural development, i.e., the "multipurpose worker". He should take the place of a local retailer when the seeds, fertilizers or pesticides he recommends are not available, repair the pump when it breaks down, organize the marketing of crops, undertake surveys, complete questionnaires, distribute contraceptives, etc.

Underlying this second theory is the observed fact that rural development agencies act in a disorganized fashion and without sufficient coordination, resulting in costly overlaps or inaction. (Is this or that livestock epidemic the responsibility of the health authorities or the agricultural extension service? In the end, nothing is done to control it.)

It was soon found, however, that this idea of a "multipurpose worker" led to overloading the extension agent with bureaucratic functions and allowed him very little time for visits. Most evaluators now consider that the administrative responsibilities of extension agents should be kept to a minimum.

(ii) External obstacles

Advice given by extension agents falls into two categories:

- it either involves the use of new inputs; or
- a reallocation of existing inputs.

In the first case, we shall ignore for the moment the problem of land, its distribution and the very limited areas available to many farmers in Asia and, to a lesser extent, in Latin America. Many critics observe that, if

the results of agricultural extension projects are so limited in scope, it is because the problem of a better distribution of land has not been previously solved. This is probably true in a certain number of cases, although we would nevertheless like to point out that:

- In South Asia, where, however inequitable the distribution of land may be, the per capita areas available are small, the primary goal of extension activities is to increase average yields and it is by no means clear that a different (more egalitarian) distribution would contribute to this.

- In general, a more egalitarian distribution of land, associated with an agricultural extension project, can only increase average yields more rapidly than the initial distribution to the extent that large landowners have been "wasting" the land they possess, i.e., have average yields below those of small landholders. This is frequently the case in Latin America, and more particularly in Brazil, where large landowners leave a large part of their estates uncultivated. But where this is not so, failure of an agricultural extension project cannot be attributed to the inequitable distribution of land.

Besides the land, the inputs recommended should be within the grasp of farmers. Purchases of fertilizers, seed and pesticide should cost significantly less than the value of the increased crop it is expected to obtain.

A number of writers point out that various recommendations have not been adopted in the absence of a suitable system of credit.

Others draw attention to the absence of a marketing network on a scale adequate to dispose of the additional crops expected. Some projects, such as Masagana, in the Philippines, have so successfully increased output and yields that prices have collapsed--a boon for urban consumers but not

necessarily for the farmers.

Recent agricultural extension projects, more especially the training and visit system, have made a more positive effort to limit recourse to new and costly inputs, whilst focusing more and more on the development of food crops, which present fewer marketing problems and directly benefit the families of the farmers involved.

(c) Complementary and/or substitution factors

Three factors may complement or substitute for agricultural extension services:

- applied agricultural research services;
- the education of the farmer;
- the mass media.

(i) Applied agricultural research services

Evenson (1976 and 1978) showed that, in the breakdown of total expenditure on agricultural research and agricultural extension activities, the share of research was significantly smaller in the Third World. He believed that this could in some measure explain the slow growth of agricultural productivity in these regions and might be one of the reasons for the low level of effectiveness of agricultural extension services, which are unable to provide a wide range of advisory services adapted to the needs of different agricultural micro-regions.

Malassis (1975) recommends that basic research (belonging as it does to the world at large) be left to the affluent countries and that the research capabilities of the developing countries be concentrated on applied research.

In fact, the distinction between applied and basic research is artificial. Where is the dividing line? Can one be certain that the emergence of specific agricultural innovations in tropical regions does not

depend on specific choices further back in the field of so-called basic research for tropical conditions?

Many of the writers recommend the development of technologies and methods suited to local conditions rather than importing them from the developed countries. They complain that the research stations are excessively concerned with export crops and pay insufficient attention to food crops. This complaint has often been well-founded but the current trend is now toward an increasing orientation of research, of rural development projects, and of advice from the agricultural extension services to food crops. The development of cash crops by small farmers need not necessarily be at the expense of food crops, as Perraton, Jamison and Orivel (1981) have observed in Malawi, where there is a positive correlation between food production per family and cash crop production.

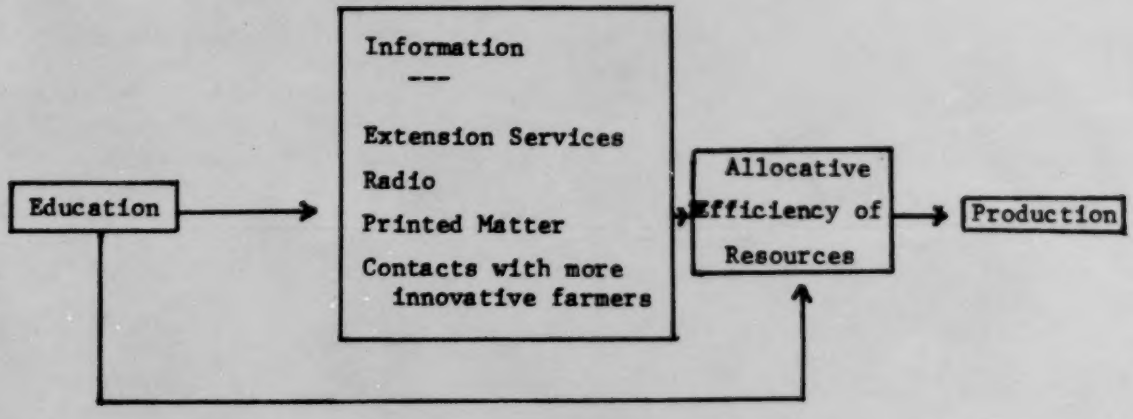
(ii) Education of farmers

Jamison and Lau (1980) and Lockheed, Jamison, Lau (1980) have examined the relationship between the educational level of farmers and their productivity. They produce solid evidence for the positive effects of education on production, productivity and farmers' income. The rate of return on educational expenditures for farmers is no lower than that noted for other types of employment.

Most writers consider that the process by which education makes its impact is better allocation of resources (allocative efficiency). The better-educated farmers make a better choice of inputs, combine them more effectively and judge the appropriate quantity better.

Ram (1980) adds with pertinence that this better allocation of resources is due to the fact that education reduces the marginal cost of information (information that is useful in selecting the most productive

combination) and thus increases the marginal benefits of such information. The drop in the marginal cost of information stems from the fact that educated farmers communicate better, establish better contacts, have a wider vocabulary, can read written information, etc. Lastly, educated farmers are better at making overall judgments and are more open to innovations.



The effect of education is thus twofold: a direct effect, in that it improves the individual's judgment in the choice of the optimal combination of inputs, and an indirect effect, by improving the individual's ability to obtain access to information pertinent to the choice of this optimal combination.

On this basis, education and agricultural extension could be regarded as complementary. This is in fact the usual finding of probability analyses, but not in multiple regression analysis.

Educated farmers are more active than the others in seeking information, particularly such information as they can obtain from extension services. According to Lele (1977), in the CADU project in Ethiopia, the best educated farmers benefit most from the extension services.

Perraton, Jamison, Orivel (1981) arrived at the same findings in

Malawi: educated farmers are twice as likely to be in contact with extension agents.

Harker (1973) has shown, on the basis of a Japanese sample, that the better educated the farmer is, the more actively he seeks additional knowledge. He also noted that graduates of agricultural schools made more use of the services of extension agents than did graduates of non-vocational schools. Lee (1970) has found the same in the case of a Korean sample.

These results are consistent with the assumption that more educated farmers tend to be more active in seeking relevant information, but the kind of information depends on availability and personal experience. Graduates of agricultural schools who have been accustomed to agricultural institutions, have likely met extension people during their training, and go naturally to them when they become farmers. Graduates of general schooling institutions do not have these connections, but prefer to have access to agricultural information through books, journals and newspapers.

Coughenor (1960) came to a slightly different conclusion--the better educated farmers are, the more they tend to supplement their knowledge from written material rather than by consultation with extension agents.

On the whole, education tends to increase the probability that farmers will seek additional information more actively, and often such information is obtained from extension agents. But this tendency does not necessarily imply a specific combined effect of education and extension, as shown by mixed results from multiple regression analysis.

Hayami and Ruttan (1971) report a positive finding, whereas Moock, Jamison and Shrestha (1981) found that the combined effect, although not significant, was negative (a Nepalese sample); this raises doubt as to the multiplier effect of the two factors but does not invalidate the conclusion

that each may have a positive effect and that education increases the likelihood of the farmer benefiting from the extension services.

Other studies (Baidya, Chou, Jamison, Moock and Shrestha (1980), Hong (1975), Lockheed, Jamison, Lau (1980) and Moock (forthcoming)) tend to confirm that education and extension services are substitutes for one another rather than complementary. It should be noted, however, that the interaction of the two factors, whether the coefficient of regression is negative or positive (- or +), is not statistically significant; it might be prudent to conclude that the interaction of the two factors does not have an effect in itself.

(iii) Agricultural extension activities and the mass-media

Agricultural extension services employ labor-intensive methods, based essentially on personal contact and demonstration. Whatever the quality of organization and management, this is still a relatively costly approach. There are less expensive means nowadays of spreading information, by the written word, television, radio, films and the telephone, and in the developed countries these are the chief means of access to information available to farmers.

These means are only less costly, however, if the necessary infrastructure already exists and if the agricultural information programs they carry only have to bear the marginal cost of the technology involved.

Radio and television are only cheap if agricultural programs occupy no more than a small proportion of daily broadcasting time (about one hour), so that the greater part of the amortization cost of the radio network is borne by others. Similarly, radio or television receiving sets must already be available to farmers so that the marginal cost of receiving the programs is negligible.

Perraton, Jamison and Orivel (1981) made a study in Malawi of the respective costs of the different channels of information available to farmers: extension services, radio, printed matter, training courses (resident or non-resident), film shows and puppet shows (with mobile teams travelling from village to village). A varied and more or less complete range was thus covered. The costs were compared with the quantity of information obtained by the farmers through each of these media. Radio is far and away the least expensive channel for the amount of information received, and the extension services by far the most expensive. This does not necessarily mean that the extension services are not worthwhile, since certain types of information can probably only be disseminated and understood through such a system, particularly where the farmers are illiterate.

Very few studies have been made to try to establish what is the best combination of media, or to determine what type of information is best suited to each medium. It seems probable that, on the average, one hour of listening to the radio is less effective than a one-hour visit with an extension agent. But if the cost of the extension hour is 1,000 times that of an hour listening to the radio (in Malawi the multiple is 3,000), the cost-efficiency ratio for radio is likely to be extremely favorable.

Many developing countries do not have the necessary financial means to provide intensive extension services on a regular basis to rural areas, and in some cases radio might be the best substitute from the economic standpoint.

Radio, moreover, is a very valuable instrument for transmitting information to the extension agents themselves, reducing the need for visits to headquarters that are costly in terms of both time and money.

Two studies (McAnany, 1980; and Jamison, McAnany, 1978) offer numerous examples of the use of radio in rural development projects. They

show that this is now one of the least expensive technologies and, if used judiciously, could have a significant impact.

Nevertheless, it has not been definitely shown that radio alone can have a decisive effect on the adoption of new agricultural methods. Shore (1980) has found, from a sample of Indian farmers, that although radio was the medium least inequitably distributed (76% of the farmers had access to it), its use had had no significant impact on the introduction of innovations.

Rogers, E.M. (1970) emphasized the effectiveness of group listening: "The efficiency of radio forums in diffusing innovations is much greater than either literacy, reading classes or community newspapers, whether cost is measured for peasant receivers or for change agencies."

In our opinion, radio is an ideal complement to extension services. It can permit a reduction in the ratio of extension agents to farmers, if the task of disseminating information is judiciously divided between the two systems. Radio should be an integral part of the extension service to ensure the best coordination. This does not mean that the extension service should have its own radio station since it is much less expensive to use the transmitter of an existing station part-time.

Conclusion

We have seen from this survey of the internal effectiveness of agricultural extension services that certain writers call in question the objectives of rural development backed by agricultural extension services. Most of these writers have in common a non-directive philosophy, but since they fail entirely to consider the costs of the non-directive approach these arguments remain somewhat rhetorical. Although for a long time the aim of greater equity was not a major concern of agricultural extension services, critics have gone into this aspect in great detail and have pointed to an

increase in disparities between farmers, without stopping to inquire whether these greater disparities were an inevitable result of the development process itself or were specifically attributable to the action of extension services. The generally pessimistic conclusions of writers who have engaged in these internal evaluations stem from the fact that they have all too often left out of account the external impact of extension work, i.e. its impact on production, yields and income. By this very omission, however, such critics have played a useful part in drawing the attention of decision-makers to certain obstacles to both internal and external effectiveness of the services, and at the same time to some factors that could increase project effectiveness.

III. EXTERNAL EVALUATION OF AGRICULTURAL EXTENSION SERVICES

The external evaluation of the impact of agricultural extension services is essentially based on economic analysis. It followed, in point of time, fairly closely on the methodology used to estimate rates of return on education, and it is not just by chance that this field of knowledge, like the theory of human capital, owes its existence to T.W. Schultz.

The dissemination of innovative techniques in the agricultural sector to increase productivity implies the prior development of these techniques, and consequently the existence not merely of extension services but also of research institutions. The writers primarily concerned with external evaluation have therefore also examined the state of agricultural research, an intermediate factor necessary for the proper functioning of the extension services.

In this third section, we propose to make a rapid review of the methods employed by these writers and the empirical findings to which the

different methods have given rise. The description of each method and the related empirical studies is followed by some general comments.

(1) Methods

Internal rate of return. The internal rate of return equalizes discounted costs and earnings over a period t , the earnings here being measured by the inputs saved as a result of the new production technologies introduced. The cost-benefit method, which is similar, involves the parallel measurement of the costs and benefits of the program.

Correlation at the regional level (preferably micro-regional but also intercontinental) between the expenditure on agricultural extension services and progress in agricultural productivity, in order to establish whether the areas that spend most make significantly more progress in productivity than the others.

Comparisons of yields (time-series or cross-section). This is a comparison of average yields before and after the introduction of extension services or as between regions with and without such services.

Micro-economic production functions, taking as a unit of observation the farmer himself and used to measure the marginal return on use of agricultural extension services. The specification of these functions may vary ("Cobb-Douglas" functions, profit functions, constant elasticity of substitution, etc.). The independent variables may either be introduced directly or as logarithms or as dummy variables.

(2) Results

Internal return and cost-benefit methods

(a) Research alone

- Griliches (1958). Rate of return of 700% for hybrid maize and of 360% for hybrid sorghum in the United States.

- Peterson (1967). Rate of return of 140% for poultry in the United States.

- Ayer and Schuh (1972). Rate of return of 90% for cotton in Brazil.

- Barletta (1967). Rate of return of 75% for wheat in Mexico.

- Akino and Ayami (1975). Rate of return of 75% for rice in Japan.

- Bredahl and Peterson (1976). Rate of return of between 36% and 40% for various products in the United States.

(b) Research with extension service activity

- Schultz (1971) has shown that in 1950 in the United States, agriculture sector input savings alone amounted to US$9.6 billion, whilst cumulative research and extension service costs from 1910 to 1950 totaled US$7 billion.

- Peterson (1971) calculated that the US$9.4 billion devoted to research and extension service activities in the United States between 1910 and 1967 enabled a saving of US$25.9 billion to be made in 1967.

(c) Research with or without extension service activities

- Araji, Sim and Gardner (1978) estimated the rates of return for 9 agricultural products in the United States. These varied between 33% and 105% (with the exception of cotton). The absence of extension services would reduce these rates by between 25 and 60% according to the product. (The fall is lowest for products controlled by a small number of large producers).

(d) General observations on these studies

The high rates of return on agricultural research with or without extension service activities are due to the fact that all improvements in productivity in the sector are attributed to them, although it is clear that these are the result of a complex series of factors:

- progress in the mechanization of agriculture;
- progress made by industries manufacturing agricultural machinery;
- improvements in technology and management skills;
- increased education and higher qualifications of farmers;
- progress made by the chemical industries producing fertilizers, pesticides and weedkillers;
- progress in irrigation techniques;
- impact of the expansion of agricultural structures (increase in the scale of farms);
- upstream progress in fundamental research.

All the improvement in productivity cannot be attributed solely to these programs. Moreover, there must certainly have been some unsuccessful programs which have probably received less thorough evaluation.

Method of geographical comparisons

The approach adopted here has been to relate expenditure on research and extension services within given geographical limits (county or district, major region, the State, the continent) to improvements in agricultural productivity. The empirical studies have included the United States and India, on the one hand, and the entire world, on the other, divided into major continental regions. The two principal writers are Evenson and Huffman.

(a) Results

- Evenson and Jha (1973). Analysis of patterns of agricultural productivity in various regions of India between 1953/54 and 1970/71. Agricultural extension programs (with due allowance for their age and experience) combined with research activities are correlated meaningfully and positively with increases in productivity.
- Huffman (1974). Analysis of patterns of agricultural productivity

in the United States corn belt between 1959 and 1964. Extension and education are seen to be substitutes in the optimum utilization of nitrogen fertilizers.

- Cline (1975). Those regions of the United States that have most increased their spending on agricultural extension services are generally those in which the most significant changes in productivity have occurred.

- Evenson and Kislev (1975). These writers have made numerous studies relating, by major region, agricultural research--measured in terms of the number of scientific publications--and agricultural productivity. For example, they have found a correlation coefficient of $R = 0.93$ for wheat (64 countries) and $R = 0.85$ for maize (49 countries).

- Mohan and Evanson (1975). Study of a certain number of districts in India showing that between 1959/60 and 1970/71 those that introduced programs of intensive agricultural development were also those that experienced the most rapid changes in farm productivity.

- Evenson (1976). This study is the first to provide worldwide data on the cost of agricultural research and extension services. It shows that the poor countries devote less effort to research and relatively more to extension services. The author believes, however, that research shows a higher return and that the developing countries have not adopted the best strategy.

- Evenson (1978). Regional American data on a number of agricultural products covering the 1949 to 1971 period. Extension service activities are generally regarded as a substitute for education of farmers. Their effectiveness is all the greater when the effort put into applied research is substantial. Estimated internal rate of return on extension service costs: 110%.

- Huffman (1978). Data relating to four American states in 1964. The

effectiveness of extension activity appears to depend on the nature and combination of crops. Rates of return vary with the product from very "positive" to negative. The level of effectiveness is higher in the case of crops than in that of stockraising.

(b) General observations on these studies

These studies show that the United States, which spends more than other countries on agricultural research and extension services, also has a more productive agriculture. Similarly, within the United States, those regions that devote the most energy to agricultural research and extension activities also have the most dynamic agricultural patterns. Outside the United States, only in India has research on regional data been undertaken. There, the results are less clear.

These studies raise two fundamental problems:

- On the methodological plane, there is an element of uncertainty in causation of the same kind as is to be found in studies relating education costs to economic growth (cf. Eicher-Orivel, 1980). Is it the efforts made in support of agricultural research and extension activities that result in a highly productive agriculture, or is it the existence of a productive, rich and strong agricultural base that makes it possible to provide substantial resources for research and extension activities? In practice, the relationship between these two phenomena is very likely to be reciprocal, although it is impossible to say which comes first in the final analysis. It may well be that American farming draws its vitality and dynamic characteristics, in the first place, from a series of factors such as:
  - more favorable climatic conditions;
  - good natural irrigation (not everywhere, but in many regions);
  - systems of land tenure that provide each farmers with a

significant land area at low cost;

- energy and drive of the farmers (the spirit of enterprise of the immigrants);
- highly efficient agricultural machinery industry with low energy costs, etc.

Such conditions have from the outset, irrespective of all research and extension activities, made of American agriculture an affluent and powerful lobby, which has subsequently been able to consolidate its advantages through investment in research and extension activities. There is nothing to indicate that a similar effort, undertaken in different contexts, in Africa or Asia, will produce the same results, just as it is clear that the substantial efforts made by Cuba and Albania in public investment in education have failed--despite the predictions of the Denisonian version of the human capital theory--to bring about rapid economic growth.

- On the decision-making plane then, even if the relationship between cause and effect applies globally, these studies are of little use in indicating optimum levels of expenditure on research and extension activities.

Even if we assume that Africa were to decide to double or triple its expenditure on research and extension activities--which would represent a major effort on its part--and that these measures did not result in any increase in the productivity of African agriculture, this would not in any way modify the ex-post facto conclusions of an Evenson-type study (1976) showing that the regions of the world that spend more have high levels of agricultural productivity, given the magnitude of the disparities that exist on a world place.

Method of comparisons of yields

(a) Results

- Ribeiro and Wharton (1966). This rural development project in four districts in Minas Gerais reports average yields per hectare for maize that are much above the average for the State:

Raul Soarez	8,276 kg/ha
Forminga	11,262 "
San Joao Nepomuceno	9,460 "
Tres Pontas	8,540 "
Average for Minas Gerais	1,300 "

- Myren (1966). This also was a project to develop maize growing, but results indicated by a comparison of the overall rate of growth of maize production in the two project regions and in the rest of Mexico were less spectacular and less consistent than the findings in Minas Gerais.

	Period	Jalisco	Vera Cruz	Mexico
Percentage increase in	1957 to 1963	127	147	113
maize production from:	1957 to 1964	160	132	136
	1950 to 1964	230	134	143
	1940 to 1964	307	136	181

These figures demonstrate dramatically the extent to which statistical results can be affected by the choice of the base year, the observation year, climatic variations, and other random variables.

- Benor and Harrison (1977). Seyman irrigation project in Turkey (1967-72) for cotton growing:

Yields (tons per hectare)

Before the project	After the project	
1966	1969	1971
1.7	3.0	3.8

- Lele (1977). In this remarkable and comprehensive study, Uma Lele

examines agricultural development projects in Africa primarily from a qualitative standpoint. Statistical data for yields is provided in the case of three of these:

* CADU project (Ethiopia), 1966-71:
  - Little impact on yields save in the case of wheat (yields having risen from 1.6 t/ha to 2.0 t/ha).
  - Substantial increase in the areas under wheat, resulting in a significant increase in global production, a fall in wheat prices, the accumulation of substantial stocks and a shortfall in milk production, wheat-growing having taken over from animal husbandry.

* WADU project (Ethiopia):

		Yields in t/ha	
		Before the project	After the project
Uplands	Maize	8.0	20.0
	Wheat	9.0	17.0
	Teff	5.5	7.0
Lowlands	Maize	12.0	24.0
	Cotton	1.4	10.0
		1.0	9.0

The success of this project was much more marked than in the case of the preceding one. According to the commentators, this is due to:

- the organization of a sound credit system;
- the natural fertility of the soil;
- the motivation and performance of the farmers;

- the efficiency of the extension services.

* LLDP project (Malawi), 1969-74:

This project, which was intended to increase maize and groundnut production, had disappointing results.

- Global production: somewhat unreliable data but substantial increase in maize production and practically no improvement in the case of groundnuts;
- Yields: very minimal increase in the case of maize. For groundnuts, yields were lower than those recorded in areas outside the project.

- Benor and Harrison (1977). Chambal project (Madhya Pradesh-India). Project to increase yields of rice and wheat in Madhya Pradesh, including investments in irrigation and in a Benor-type extension system.

	Yields in t/ha		
	Before the project	After the project	
		1974/75	1975/76
Rice	2.0	2.4	2.8 1/
Wheat	1.3	2.0	

1/ Average yield of 3.7 t for the 17% of the farmers who followed all the advice given by the extension agents.

- Benor and Harrison (1977) and World Bank Report No. 2171 a-IN (1978). Chambal project (Rajasthan-India). Project similar to the preceding one in a different region of India.

Average yields per hectare

	Before the project	After the project		
		1975/76	1976/77	1977/78
Rice (irrigated)	2.00	3.35	3.60	4.36
Sorghum	0.44	0.40	0.66	0.83
Wheat	1.17	2.26	2.11	2.31
Grasses	0.69	0.75	0.94	0.72
Sugarcane	40.90	n.d.	59.40	60.50

Yields as a function of the size of farms and of the percentage of new methods adopted

Size in ha	Rate of adoption up to 50%	Rate of adoption over 50%
0 - 0.99	2.37	3.92
1 - 1.99	2.63	4.05
2 - 3.99	2.97	3.79
4 - 7.99	3.18	4.39
8 and up	2.70	4.16

- World Bank Report No. 1288 a-IN (1977). Benor-type extension project plus irrigation in western Bengal.

Yields in t/ha

	Before the project	After the project
Wheat	1.2	2.7
Rice	0.8	2.0

- Vicente de Jesus (1979). Masagena 99 is a Philippine project designed to increase rice production in three ways:
  - A network of extension service technicians;
  - A credit system;

- Radio programs.

The project has made it possible to move from a position of dependence (rice imports) to one of surplus over a period of four years. Net cash earnings of farmers have doubled between 1973 and 1977. The extent of increases in yields is not known.

- Institute of Development Studies (1968). In this special issue, devoted to the result of the Green Revolution in India, it is pointed out that over a period of 10 years (1963-65 to 1972-74), average yields per hectare increased by 60% for wheat and 13% for rice.

(b) General observations on comparisons of yields

The serious failing in these studies is that they do not permit the identification of the role of each factor in increased yields. In practice, the latter is the result of a complex process involving:

- community investments (irrigation);
- individual inputs having a monetary cost (pesticides, fertilizers);
- individual inputs having no monetary cost but an opportunity cost exceeding 0 (labor);
- new methods of cultivation that do not represent an expense to the farmer (most of these are provided by the extension service);
- the introduction of high-yield varieties.

Moreover, to the extent that these are time series studies, there is an unknown contingency factor (climatic variation, rainfall).

They do not therefore permit the measurement of yields specifically attributable to the extension service. It should be noted here that in evaluation studies of World Bank projects in this field, the rates of return are very high, due in part to the fact that increases in yields are attributed

entirely to the project, although the latter has merely reinforced a pre-existing extension system that was not itself without cost.

Method of individual comparisons

These studies focus on the farmer as the unit of observation. They may be time series, if it has been possible to monitor a sample of farmers before, and then after, the introduction of an extension service. This only rarely happens. They are more usually cross-section, i.e. they are based on samples of farmers, some of whom have been in contact with the extension services and others not. So far as statistical verification is concerned, most of these studies use Cobb-Douglas-type production functions, where the coefficient estimated for each independent variable expresses its output elasticity.

(a) Results

- Patrick and Kehrberg (1973). Cross-section study of five samples of farmers in Brazil, in which only one of the samples is based on more than 100 observations. All these farmers are located in regions with agricultural extension services, but the number of individual contacts with extention agents varies from one farmer to another. The estimated production functions for the five samples show that the more frequent the contacts, the higher the productivity, but this ratio only assumes significant proportions in one of the five cases.

- Harker (1973). This is a cross-section study of a sample of 971 farmers in Japan. The use of agricultural periodicals, radio programs and extension agents significantly increases the productivity of farmers.

- Moock (1973). 152 maize growers in Kenya. Very slightly positive but not significant impact of extension services.

- Hopcraft (1974). 674 farmers in Kenya. Productivity increases

significantly with the number of visits up to 4-7, then stagnates. Demonstrations are very effective but not attendance at farmers' training center courses.

- Hong (1975). 895 farmers in the Republic of Korea. Extension activities significantly increased the technical and economic efficiency of farmers, a tendency that becomes more marked in the case of older and better educated farmers. Annual rate of return: 449%.

- Halim (1976). Three samples of farmers in the Philippines. The number of contacts with extension agents significantly increases productivity in two instances, but not in the third.

- Pachico and Ashby (1976). 382 farmers in Brazil. Productivity falls significantly with the number of contacts.

- Hay and Jamison (1977). 403 farmers in Thailand. Attendance at extension service classes significantly increases productivity.

- Jamison and Lau (1978). Two samples of farmers (184 and 91) in Thailand. The number of visits to the village by extension service agents significantly increases the productivity of those who use chemical fertilizers. But this factor is negative (although not significantly so), in the case of farmers who do not use fertilizers.

- Academy for Educational Development (1978). The "Basic Village Education" project in Guatemala has experimented with various extension methods for poor farmers in Guatemala (radio programs alone; radio programs plus instructor; and, in some cases, presence of an agriculturist). The experiment has been highly successful in terms of the number of farmers contacted and the adoption of new farming methods, although increases in productivity have remained small.

- Baidya, Chou, Jamison, Moock and Shrestha (1980). 683 farmers in

Nepal, growing two crops of rice and sometimes winter wheat. Contacts with extension agents have a non-significant positive effect for the second rice crop and a very slightly significant positive effect for winter wheat.

- Huffman, W.E. (1981). This very interesting study of 295 farmers in the southern United States shows, on the one hand, that the farmers receiving assistance from the extension services have a significantly higher productivity than the others and, on the other hand, that inequality of access, in terms of both quantity and quality, by black farmers and white farmers to the extension services explains in part the difference in earnings between these two groups.

(b) General observations on these studies

- Summary of results

Whereas with the two preceding methods, the postulated relationship was almost invariably positive, the results of these studies of samples of farmers are more divergent:

- 9 studies provide significantly positive correlations, although in some instances the scope of the findings is narrow;
- 8 others produce results that are positive but statistically without significance;
- 3 produce a negative result that is not statistically significant and one a significantly negative result.

- The method

So far as the empirical verification of the human capital theory is concerned, the economic analysis of the effectiveness of agricultural extension services has followed the same road as educational economics.

- Initially, studies of the rate of return of the Becker type (based on averaged data);

- Followed by macro-economic relationships of the Denison type (based on aggregated data);
- Estimates of the age-gains profile corresponding to the comparison of rates of return (again based on averaged data);
- Finally, an analysis of the variance of individual gains (based on individual data).

In both cases, the first three methods provide results that are very positive, although scientifically questionable, as they oversimplify the factors and processes leading to the observed results. For the most part, this objection does not apply to the studies based on individual data, which are far and away the most important among the recent literature. Whereas the first three methods are characterized by overoptimism as to the real impact of agricultural research and extension services on productivity, the fourth tends to underestimate this impact. The improvement in productivity achieved by farmers who have not been in contact with extension agents but who, little by little, come to imitate their fellows who had previously adopted the innovations suggested by the extension services represents an indirect but nonetheless real effect of extension activity. The studies made in Nepal (see Baidya, Chou, Jamison, Moock, and Shrestha (1980), and Moock, Jamison, Shrestha (1981)) indicate that besides the direct impact of extension work (sometimes significant, sometimes not significant), a significantly positive factor with a higher value reflects the effect of the percentage of farmers in the same panchayat who have recently been in contact with extension agents. It is a kind of bandwagon effect, with multiplier potential, that occurs when adoption of an innovation no longer represents marginal behavior. It then becomes the new norm and is adopted by the majority of farmers, whether or not they have been in contact with extension agents.

Conclusion

Increasing agricultural productivity is a process which takes time, and which sometimes has negative secondary effects (increased disparities between farmers, a decline in food crop production). The second of these effecs can be fairly easily avoided if the project is well designed, but the first is a more difficult problem which calls for special policies on the part of governments.

When agricultural extension projects are viewed in the short term, the results are often unequal, inconsistent and sometimes disappointing. There are many Cassandras among the critics. Although some of their warnings have an undeniable value, they are probably wrong in the long term. A diagnosis of disaster may be more an effective incitement to action than studies dwelling on progress already achieved but it can also have a discouraging effect.

There is a whole stock of agricultural innovations awaiting dissemination to increase productivity. The extension services are playing, and can continue to play an effective role in this dissemination. The major obstacles to the adoption of new techniques (conservatism, lack of capital, bottlenecks in supply of inputs and marketing of outputs) are well known by now, and have been largely taken into account in new projects over the past ten years.

There are still two questions that are not properly clarified and call for further research, namely, the question of the interaction between the educational level of farmers and their access to extension services, and that of the best vehicles for the various types of information.

The question of the best vehicle in terms of cost and effectiveness for each type of information has not been sufficiently studied. Certain types

of information now disseminated by extension agents could be disseminated more cheaply by radio. Extension workers--the medium which costs the most per hour of contact--should be used only for information that they alone are capable of transmitting effectively.

It is well established that educated farmers are more active in seeking information, and that they make better use of the acquired information. But extension services, by themselves, are not a satisfactory substitute for the whole package of education plus information. Education seems to remain a big point in the long run in the rural development process. But several points, here, need to be clarified.

First of all, is there a threshold, in terms of a minimum number of years of education, under which the impact of education is not significant? We assume such a threshold exists, but additional research should be undertaken to assess this assumption.

Second, there is the problem of the optimal educational policy, given budgetary constraints. Most poor countries have not yet achieved universal primary education, and some countries will have to choose between expansion of primary education and adult literacy programs. What is the most cost-effective strategy? Here again, more research is needed.

Finally, there is the question of educational content and curricula. Many observers argue that these should be more oriented toward the needs of rural communities, more practical, more adapted to rural and agricultural life. But if the main impact of education is to make people more innovation-oriented, more able to have access to information, to select it, and make the best use of it, it is not necessarily these changes in curricula that will achieve these objectives. The assumed superiority of vocational, practical curricula versus general one remains to be demonstrated.

ANNEX

Table 1: Daily Calorie Supply per Capita in 1964-66 and in 1977 1/

	Daily calorie supply per capita	
	1964-66	1977
Kampuchea, Dem.	2,168	1,926
Lao PDR	2,005	2,082
Ethiopia	2,152	1,754
Mali	2,159	2,117
Nepal	2,218	2,002
Somalia	1,778	2,033
Burundi	2,017	2,254
Chad	2,259	1,762
Mozambique	2,108	1,906
Burma	2,011	2,286
Upper Volta	2,060	1,875
Viet Nam	2,134	1,801
India	1,948	2,021
Malawi	2,257	2,066
Rwanda	1,908	2,264
Sri Lanka	2,219	2,126
Guinea	2,075	1,943
Sierra Leone	2,185	2,150
Zaire	2,036	2,271
Niger	2,211	2,139
Benin	2,230	2,249
Pakistan	1,993	2,281
Tanzania	2,170	2,063
Afghanistan	2,000	2,695
Central African Rep.	2,172	2,242
Madagascar	2,375	2,486
Haiti	1,904	2,100
Mauritania	1,981	1,976
Uganda	2,179	2,110
Angola	1,907	2,133
Sudan	2,088	2,184
Togo	2,222	2,069
Kenya	2,253	2,032
Senegal	2,348	2,261
Indonesia	1,798	2,272
Ghana	2,136	1,983
Yemen, PDR	1,895	1,945

1/ Countries are ranked by order of GNP per capita, from the lowest to the highest (developing countries only). Data of 1978.

Underlined figures indicate that there was a decline in daily calorie supply per capita between those two period.

Sources: WDR 1980. Agricultural Commodity Projections, 1970-1980. Vol. II, FAO, 1971.

Table 1 (Cont.)

	Daily calorie supply per capita	
	1964-66	1977
Cameroon	2,264	2,069
Liberia	2,287	2,404
Honduras	1,930	2,015
Zambia	2,237	2,002
Zimbabwe	2,551	2,576
Thailand	2,226	1,929
Bolivia	1,731	1,974
Philippines	1,895	2,189
Yemen Arab Rep.	2,089	2,192
Congo, People's Rep.	2,151	2,284
Nigeria	2,168	1,951
El Salvador	1,877	2,051
Morocco	2,091	2,534
Peru	2,255	2,274
Ivory Coast	2,433	2,517
Nicaragua	2,253	2,446
Colombia	2,220	2,364
Paraguay	2,736	2,824
Ecuador	1,846	2,104
Dominican Rep.	2,004	2,094
Guatemala	1,952	2,156
Syrian Arab Rep.	2,440	2,684
Tunisia	2,153	2,674
Jordan	2,430	2,107
Malaysia	2,225	2,610
Jamaica	2,243	2,660
Lebanon	2,401	2,495
Korea, Rep. of	2,421	2,785
Turkey	2,858	2,907
Algeria	1,967	2,372
Mexico	2,623	2,654
Panama	2,317	2,341
Taiwan	2,379	2,805
Chile	2,523	2,656
South Africa	2,745	2,831
Costa Rica	2,234	2,550
Brazil	2,541	2,562
Uruguay	3,039	3,036
Argentina	2,868	3,347
Portugal	2,676	3,076
Yugoslavia	3,174	3,445
Trinidad and Tobago	2,361	2,694
Venezuela	2,392	2,435
Hong Kong	2,324	2,883
Greece	2,972	3,400
Singapore	2,454	3,074
Spain	2,703	3,149
Israel	2,855	3,141

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PART II

MASS MEDIA, BASIC EDUCATION AND AGRICULTURAL EXTENSION

Hilary Perraton

Table of Contents

		Page
	SUMMARY	61
I	INTRODUCTION	63
II	AIMS AND CONSTRAINTS OF BASIC EDUCATION AND AGRICULTURAL EXTENSION	65
	A. Aims	65
	B. Constraints on education	68
	C. Constraints on agricultural extension	70
III	THE ORTHODOX APPROACH	73
	A. The quality of the evidence	73
	B. Literacy: methods, effectiveness, costs	75
	C. Agricultural extension: methods, effectiveness and costs	79
IV	USING MASS MEDIA	83
	A. Mass media with group study	83
	B. Mass media for individuals with feed back	100
	C. Radio	102
	D. Rural newspapers	106
V	THE COSTS OF MASS MEDIA	110
	A. Mass media with group study	110
	B. Mass media for individuals with feedback	116
	C. Radio and print	118
	D. Cost summary	120
VI	CONCLUSIONS	124
	A. Implications for policy	124
	B. Implications for research	126
	APPENDIX A - Mass media projects	128
	REFERENCES	141

SUMMARY

This paper surveys the evidence on using mass media to provide basic or agricultural education and to support agricultural extension in third world countries. A systematic search of the literature makes it possible to draw some conclusions about the methods, effects and costs of such use of mass media.

The paper begins by analysing the aims of agricultural extension and basic education. While the principal aim of agricultural extension is to increase agricultural productivity, the aims of basic education are often broader. They include: studying the 3-Rs; helping people to benefit from rapid change; the ability to solve problems which rests on an understanding of the relationship between the individual and society; the mastery of generative concepts; and efficiency in acquiring information.

The paper next examines the constraints within which basic education and agricultural extension work and which apply regardless of the methods of communication used. The problems of comparing orthodox with unorthodox methods of teaching are discussed. In the light of that discussion the evidence on the costs and effectiveness of orthodox literacy teaching are examined as an example of a conventional approach to basic education. This suggests that adult literacy teaching has generally been neither particularly successful nor particularly cheap. There is more limited evidence on the effectiveness of agricultural extension and it often has major problems in reaching women farmers and in reaching poorer farmers. As conventional agricultural extension is labour intensive, budgetary constraints make it difficult to improve agricultural extension by raising the ratio of extension agents to farmers.

The main body of the paper, section IV discusses the use that has been made of mass media. Mass media have been linked with group study in various ways, notably through the radio schools of Latin America, farm forums, and radio campaigns of Tanzania and Botswana. While group study necessitates a ground organisation, as well as an organisation to produce broadcasts or printed materials, it increases the effectiveness of those materials. In some countries mass media projects have been organised on the scale where, over a period of time, they are reaching an important proportion of rural adults, which we can assume to be a larger proportion than is reached by other agencies. Mass media have also been used for the teaching of individuals with arrangements for organised feedback from them. One of the techniques that has been used here is the employment of correspondence courses. These

have proved effective for teaching agriculture and are of particular importance for the in-service training of agricultural extension agents. Mass media, including both radio and rural newspapers, have also been used for education without any formal arrangement for regular feedback. While the evidence does not permit close comparisons of effectiveness between this approach and the others discussed, it does confirm that radio has been effective in communicating information to farmers in a wide range of countries.

The costs of mass media are discussed in section V. Radio schools in Latin America, teaching the equivalent of a primary school curriculum, have done so at a cost per head of between 1978US$30 and 65 a year. The large radio campaigns in Tanzania had costs of between $1 and $5 per participant for a campaign of two to three months. The cost of radio programmes by themselves, without any arrangement for feedback, is modest. While the costs vary from country to country, evidence from Malawi suggests that the cost of a one hour contact between a radio programme and a farmer is only 1/3000 of the cost of a face-to-face contact with an extension agent.

The paper concludes by discussing the implications of its findings for policy and for research. The effectiveness of mass media combined with group study, the potential of training agricultural extension agents by correspondence, and the relative cheapness of radio suggest that these are of considerable importance for basic education and for agriculture. Further research is suggested on alternative ways of linking radio with orthodox agricultural extension, on the effectiveness of extension work generally, and for further studies of the use of mass media in population, health and nutrition.

I INTRODUCTION

1.1 This paper examines the role of mass media in supporting basic education and agricultural extension. It addresses the question, 'how far, and in what way, can mass media be used as a supplement or as an alternative to orthodox methods of basic education for adults or of agricultural extension?'.

1.2 Its origin is two-fold. First, in very broad terms, it takes as a starting point the recognition that orthodox methods of extension, as of basic education, are coming up against the limits of money and manpower. The burden of school budgets means that ministries of education cannot afford to teach adults in the same way, incurring the same unit costs, as they do children. Similarly, in many countries, it is not possible to expand the agricultural extension service and improve the ratio of extension agents to farmers. Existing ratios and existing methods of working are pressing hard against financial barriers. This makes it appropriate for educators and agriculturalists to seek alternatives to their orthodox, face-to-face, methods of communication.

1.3 Second, the study follows the Bank's earlier examination of the educational uses of radio (reported in Radio for education and development:case studies)and of distance teaching for formal education (reported in Alternative routes to formal education). These suggested the potential value of using mass media and distance-teaching methods for out of school education and for extension which are examined in this paper.

1.4 Adult education and agricultural extension have different roots and are often quite separately administered. In the eyes of some practitioners they have different objectives. They are considered together here, however, because of their interdependence. Basic education for rural people will concern itself with agriculture if it is to speak to their condition. Agricultural extension, if it demands more than an unthinking response to the extension agent's remembered instructions, relies on the understanding which is the main aim of basic education. In practice, too, many peasants receive their basic education, about agriculture at least, principally from the agricultural extension agent. And in practice the methods developed by educational agencies in using mass media are relevant to agricultural extension and vice versa.

1.5 This paper therefore begins by examining the aims of basic education and of agricultural extension and the limits within which both have to work. In order to assess the value of both orthodox and alternative methods we need to look at the major problems which arise in evaluating both adult education and agricultural extension. As a starting point to that, the experience

in the third world of the costs and effects of adult literacy programmes using conventional methods, and of orthodox extension, are examined. The paper then discusses the different ways in which mass media have been used to support rural education. It then examines the comparative cost of different approaches and concludes with recommendations both as guidelines for policy and on further research issues.

II AIMS AND CONSTRAINTS OF BASIC EDUCATION AND AGRICULTURAL EXTENSION

2.1 This paper concentrates on methodology. But techniques are seldom neutral and so, before attempting to compare orthodox and mass media approaches, we examine the aims of basic education and of extension. In order to see how realistic these aims may be, they are examined in the light of the constraints on education and on extension.

A. Aims

2.2 The aims of agricultural extension are straightforward. They are to communicate information, mainly about better farming practice, in order that farmers can produce more food. Often, of course, an extension service does more than this: it may provide inputs for farmers, such as seed, fertiliser or credit, or advice on activities beyond cultivation, such as post-harvest technology or marketing. Its central aim, however, is most often to provide advice about better farming techniques. Agricultural extension services therefore assume that knowledge is available, usually from agricultural research stations, about improved methods of farming. In practice, although not in theory, extension services have often worked on the assumption that one-way transmission, of messages to the farmer, is all that matters.

2.3 The effectiveness of extension has been limited in various ways, which we consider in more detail below. One of the important limits on what an extension service can do is the background knowledge and educational level of the farmers to whom it is addressed. To take a trite example, if farmers are illiterate, an extension service can make little use of print to provide information to them. In developing countries, therefore, there is an overlap between the aims of extension and the aims of basic education.

2.4 The aims of basic education are more complex. It is, in fact, easy to make a case against any attempt to educate adults. Many adult education programmes have failed to attract students, to retain their interest or to teach them anything. There is scant evidence that adult education programmes have any great effect on students' lives. In contrast there is, in most third world countries, a strongly expressed demand for primary and secondary schools. And there is evidence of the long term effects of primary schooling on the attitudes and even the productivity of those who have been to school. Against that demand, and that kind of evidence, it is necessary to weigh carefully the case for devoting resources to the education of adults. For, unless education's share of the national budget is to grow, then devoting resources to adults means diverting them from children.

2.5 Basic education for adults has, in fact, attracted support partly for ideological reasons and partly for practical ones, where it was seen as a pre-requisite for development. The ideological reasons have been varied. Some have been religious in origin: the Roman Catholic church, for example, in both Latin America and Africa has played a leading role in some programmes of adult education. Often, too, equity has been cited as an argument for basic education to redress some of the imbalance between those who went to school and those who did not. Such education has also been seen either as a necessary preliminary to revolution against oppressive regimes, enabling poor peasants to analyse the relationship between themselves and their oppressors, or as a proper consequence to it.

2.6 For practical reasons, new regimes, and newly independent countries have often seen the education of adults as a necessity for the changes they seek within their own societies. Nyerere, for example, soon after Tanzania's independence, argued for adult education because Tanzania's development needed educated adults and could not afford to wait till the children then at school had grown up. Such arguments are still potent: in Ethiopia in the late 1970s, 'after the revolution, the government was determined to make education relevant to the needs of the rural poor who made up the mass of the people' and launched a programme of basic education for adults. (Unesco/UNICEF 1978, p.68)

2.7 The arguments for educating adults converge, whether they start with ideology or with the intention of developing society. Nyerere speaks of liberating man as well as of developing Tanzania. INADES-formation, a church-based educational agency in West Africa has, as its general aim, 'to work for the social and economic advancement of people, laying particular importance on their free and responsible participation in transforming their societies' (INADES, n.d., p.2) Radio schools in Latin America see their role as to help towards the transformation of society as well as the education of individual citizens or families.

2.8 Moving on from these broad arguments, it is possible to distinguish five qualities which mark basic education.

2.9 First, it includes teaching about the 3-Rs. These are tools, necessary for people to cope with the modern sector, and becoming necessary to cope with changes to the traditional sector. The balance between the 3-Rs will vary and literacy is not always the most important. In Ethiopia again: 'people who had formerly been nomadic gave priority to numeracy over literacy since the counting of livestock was an essential skill which they needed to acquire'. (Unesco/UNICEF 1978, p.77). But literacy and numeracy alone are not adequate components for a programme of basic education.

2.10 For, second, if basic education is to be of value to individuals or to societies, it needs to foster the ability to benefit from rapid change. Mary-Jean Bowman argues that 'the essence of development man or woman is a readiness to adapt to change and to grasp or to create new opportunities.' She goes on to suggest this requires various capabilities including adaptability and, more specifically, 'ingenuity in the creation of new opportunities or new ways of doing things in response to new opportunities'. (Bowman 1980, p.8) This ingenuity can be exercised either in transforming rural society or in moving out of it. Thus education needs - to quote an analysis from the Dominican Republic - 'a content and methodology which permits individuals to adapt themselves to a rapidly changing society and to prepare themselves for creative participation in the process of change'. (White 1976a, p.4)

2.11 Such ingenuity or adaptability depends, third, on 'balanced personal growth (intellectual, moral, emotional, social, physical, aesthetic, and psychomotor functions) ... the ability to solve problems, and personal creativity (critical consciousness)' (ibid.) More specifically, it demands the ability to articulate relationships between self and society and between nature and culture. That ability is central to Freire's method of literacy teaching with its concern to develop the student's critical consciousness of himself and his society. Freire found that his students rapidly grasped the distinction between nature and culture, explaining which things in a picture belonged to which category and why. The ability to articulate this is necessary if adult learners are to move on and consider ways in which they can change their society or their family, social and economic life. The articulation involves extending the learner's awareness of a distinction from a limited to a more general context, necessary, as Bruner et.al (1966) pointed out, 'because so much of the meaning of what is being learned is intrinsic in the context in which the learning occurs, there is very little need for verbal formulation'.

2.12 That ability to generalise leads us to our fourth quality which concerns the mastery of generative concepts - those which enable us to recall or order information. Once we have learned some higher level concepts we can generate the detail that we would otherwise forget. Once we know the principle of transpiration, for example, we can recreate all the detail we might otherwise forget about how to keep plants alive. The choice of such concepts will vary from place to place and will relate to the curriculum of basic education.

2.13 Finally, basic education needs to develop what Bowman calls 'efficiency in acquiring information'. The ability to locate and benefit from varied sources of information is crucial if basic education is to be more than the

equivalent of a board school, with its stress on rote learning of a received code of knowledge.

2.14 To sum up, therefore, the aims of agricultural extension are fairly simple and clear cut. Their achievement may depend upon the level of education of participating farmers. And that is the concern of basic education whose aims are broader and less easy to define.

B. Constraints on education

2.15 We have only limited evidence on the effects of education on adults, although there is enough for us to sketch out the constraints within which such education must work. There is a much less clear relation between literacy and productivity, for example, than between schooling and productivity. And, in an intriguing piece of research, Scribner and Cole found that literacy in the Vai script, used in Liberia but learned only out of school, 'did not substitute for schooling. Vai literates were not significantly different from non literates on ... cognitive measures (and) ... there was no across-the-board evidence of enhanced performance associated with this traditional, non-schooled literacy' (Scribner and Cole 1978, pp 27-28). We cannot simply equate the education of adults with primary schooling, about whose effectiveness we know rather more. Attitudes, for example are, it seems, permanently changed by even a short period at school. (Cole et.al, 1971). Adults who have been to primary school achieve higher scores on the 'overall index of modernity' developed by Inkeles and Smith (1974). And they tend to produce more as peasant farmers (Lockheed, Jamison and Lau, 1978). This contrast may be explained by the suggestion that the effects of schooling are the result more of the hidden curriculum - the values of order, timetabling and an imposed structure to one's work - than of the overt curriculum (cf Inkeles and Smith, 1974, p.133).

2.16 How far, then, can we expect the education of adults to affect their lives? The adults' own interests, and the amount of time they have available, set limits to the effectiveness of any educational programme.

> "In many villages of the third world there is no postal service, no banking facilities, no access to newsprint, no all-weather road, no outpost of the government's extension services ... At international conferences, there is often discussion of the value of literacy for understanding written instructions on the use and application of fertilisers: but there is very little mention of the fact that the written word is nowhere in public in many of these villages where people are meant to be diligently reading fertiliser instructions. One sees no village name; no public announcement board; no shop names, except a plot number." (King, 1979, pp.38-9).

It is not surprising that many adults choose not to spend their time learning to read and write in a literacy campaign. There is little for them to read

and reading is not important to them. Again, in many societies, women are particularly short of time and are therefore unable or unwilling to spend their precious time on educational programmes. To have any chance of success education needs to be geared to the interests of adults and the questions of importance to them and it must be available at a time and in a way which does not put unreasonable burdens upon them.

2.17 And that means there is a constraint on the curriculum. We cannot just start with the 3-Rs and assume that they will excite and attract adults. There have been two different approaches here. Some early literacy programmes have assumed that their aim is simply to teach a narrow technique. Similarly much agricultural extension and some health education programmes have assumed that their function is simply to instruct peasants in a narrow range of techniques which they must follow but not question. Even if they master all the techniques, there is no curriculum which puts together what they have learnt into an understanding of health or agriculture which is greater than the sum of its parts. More recently, as at Radio Santa Maria in the Dominican Republic, for example, educators have begun to talk more broadly about course content and argued that this needs to be 'adapted to the psychology and life-context of the rural, low-status adults' (White 1976a). If we are to follow this line of thought then we are likely to have 'an emphasis on human rights and awareness of socioeconomic inequalities' and include 'educational programmes in agriculture, nutrition and health, home-making, and childcare'. (ibid.) Few rural educators who want to go beyond instructions in a handful of techniques would quarrel with that. But it is very different from what happens at primary schools. With a captive audience of small children one can start with the traditional teaching of the 3-Rs of which schools have decades, if not centuries, of experience. (It is only in well developed schools with highly trained teachers that we begin to get a curriculum more closely based on the local environment.) (cf Beeby 1966). And there is little experience anywhere in the world in building a curriculum which starts from those interests in health or agriculture and moves on to the abstractions which capitve primary school children, with lots of time, take in their stride. Curriculum building for the education of adults is more difficult.

2.18 Perhaps even more important than these practical and intellectual constraints are the political and economic ones. There are sharp limits to what education can do in isolation. Learning about fertilisers is of little value for someone who cannot buy them. Learning improved techniques of cultivation, which depend upon land reforms, is of little value if the power

structure makes any land reform improbable. The effects of educating adults need to be assessed within the political framework of the country concerned. For education is seldom the prime mover. Where education is working against the grain of its host society, we cannot expect it to cut sharply through the major problems faced by peasants who have never been to school.

2.19 So much for the constraints on adult learners. There are two further sets which limit the work of teachers and organisers. The first concerns finance. The cost of ordinary schools, and the continual pressure to expand them, means that, usually, there is little money left for the education of adults. Lavish and expensive solutions to their educational problems are unrealistic. Second, there are few staff available to teach adults. In a very small number of countries there is a cadre of adult educators. Elsewhere adult education is likely to be staffed by primary school teachers in their spare time, by community development workers, and by agricultural extension agents or other extension workers. These groups have one thing in common: for the most part they have themselves received a relatively limited education. A common feature of the literature on agricultural extension and that on primary education is the limit which the inadequate educational background of teachers or agents sets to their own work.

2.20 Despite these constraints, there is some evidence that educational programmes outside school can have an effect on their participants. Adults do, for example, learn from some agricultural broadcasts. In Latin America, adults who have studied by radio and correspondence do make changes in their everyday life, as well as learning to read, write and pass examinations. More broadly, exposure to the co-operative movement in the Comilla project, in what is now Bangladesh, had a greater effect on 'overall modernity' than attendance at school. (ibid. p 20) The point of quoting isolated examples here is to demonstrate that the education of adults may be justified by works as well as by faith. We will look in more detail at the evidence from a variety of educational projects in part IV, below.

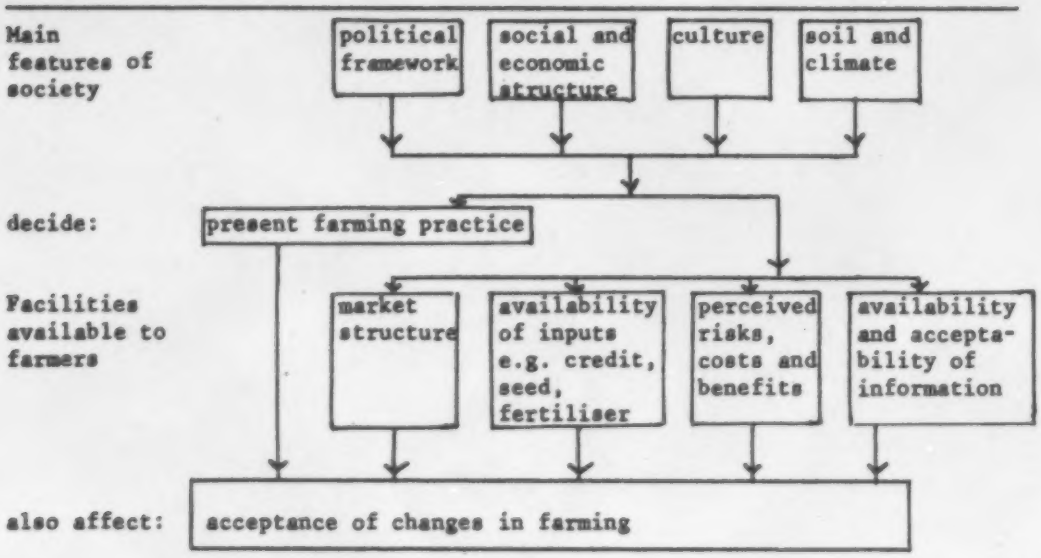
C. Constraints on agricultural extension

2.21 Agricultural extension, too, works within definable limits. It has a long history, going back at least as far as the 13th century (Brown 1971, p.2), and a simple theoretical basis: agricultural research workers develop better farming techniques and the extension service exists to make that information available to farmers. One might therefore expect a well documented and high correlation between extension activity and productivity. Agricultural extension services in the third world have, indeed, burgeoned, encouraged by that assumption, by the belief that extension has had a history of success

in metropolitan countries, and by ministries of agriculture wanting to raise productivity.

2.22 There are two sets of reasons why the relation between extension and productivity is, in fact, much less straightforward. First, extension is only one among a number of determinants of agricultural production. Some of these are set out in Figure 1. If an extension service can affect only the availability of information to farmers, its effects may be swamped by those of other factors.

Fig. 1 What determines agricultural change



2.23 Second, extension services have often themselves not been particularly efficient. They have been criticised on both broad and narrow grounds. The broadest-based criticisms have shown that much agricultural extension is socially regressive, concentrating its benefits on richer rather than poorer farmers, and tending to widen the gap between the rich and the poor. Almost universally it has concentrated on the needs of men, even in societies where women do most of the agriculture. From a narrower perspective five major difficulties have been identified as confronting agricultural extension:

- Extension agents have often been too young and under-trained so that they could persuade neither through the authority of age nor through superior knowledge.
- Often they have lacked an appropriate organisational structure so that they have been inadequately supervised, been given ill-considered tasks and have had to waste their time on bureaucratic trivia.

- They have been too thin on the ground to have any significant impact on many farmers. In northern Nigeria, for example, one study showed that only 14% of farmers had any contact with extension agents (Giltrow and Potts 1978, p.D2)
- Too often agents have had little to teach that would benefit farmers. Often there have been neither simple, (Norman 1976, p.174) nor even complex, (Mellor 1973, p.95) innovations they could offer, despite the hope that there would be in the future.
- There have been inadequate channels for farmers or extension agents to communicate with research workers:

> 'We witnessed what can happen when research experts and farmers get together - generally a rare event - on a visit to the lush rice-producing District of Tanjore in the South Indian state of Tamil Nadu. In a series of roadside seminars, farmers beseiged with sharp technical questions a group of experts, including India's leading rice research expert ... In many instances, the experts had no ready answers but, having seen for themselves what the farmers needed, they promised to try to get answers' (Coombs with Ahmed 1974, p.119)

III THE ORTHODOX APPROACH

3.1 We can use the evidence of orthodox basic education and extension as a benchmark from which to survey the use of unorthodox approaches which rely on mass media. The best documented work in adult education is on literacy.
3.2 There are, however, three difficulties in making such a comparative analysis. The first is the lack of control groups. While we can find groups who do, or do not, participate in literacy programmes or have contact with extension agents, the groups are seldom comparable in other ways. We are therefore forced back to more tenuous evidence, or to multivariate analysis, which leaves unclear the direction of causality. The second difficulty is of particular importance for agriculture: we lack a typology for extension. Extension work varies, from place to place in many ways: in the ratio of farmers to agents, the variety of crops, the relative scarcity of land or of labour, extension's own administrative structure and so on. But the literature on extension and its effectiveness often assumes a homogeneity which neglects these differences. The third difficulty is posed by the quality of the evidence itself.

A. The quality of the evidence

3.3 To assess the value of orthodox approaches to education or extension we need some agreed measures of their effectiveness. These are not easy for either sector. There is no simple agreement, for example of what we mean by literacy. Unesco's Experimental World Literacy Programme seems to have defined literacy as the level achieved by school children after four to five years at primary school, while the Tanzanian literacy programme of the 1970s regarded the second year primary level as the criterion. (Unesco 1976, p.185). At another extreme, in Yugoslavia functional literacy has been defined as 'that educational level comparable to the eight years of schooling required of children in the Yugoslavian elementary system' (Savicevic 1973), while those responsible for the British national literacy campaign and its evaluation in the late 1970s have been sedulous in avoiding a definition of literacy, or success in literacy. In the Tanzanian national campaign, four levels of achievement are recognised:

I Enrol and attend 2/3 of the sessions in one year;
II Recognise words and symbols; write simple short sentences, add and subtract one-figure numbers (semi-literate);
III Read a simple text with understanding, write a simple text, multiply two-figure numbers and divide one-figure numbers (literate);
IV Continuously use literacy skills, can read and write letters, read a newspaper, keep accounts (functionally literate).

(Unesco/UNDP 1976)

Thus, even where we have figures for literates, we may not be able to compare like with like.

3.4 Much literature on agricultural extension has used the acceptance or adoption of innovations as a measure of effectiveness, without going on to investigate the relationship between such adoption and agricultural productivity.

3.5 Another body of literature has looked at the correlations between agricultural research or extension and productivity on country, region, or world wide bases. Most such studies have been based on rich countries rather than poor and, as Orivel says:

> On the methodological plane, there is an element of uncertainty in causation of the same kind as is to be found in studies relating education costs to economic growth.... Is it the efforts made in support of agricultural research and extension activities that result in a highly productive agriculture, or is it the existence of a productive, rich and strong agricultural base that makes it possible to provide substantial resources for research and extension activities? In practice, the relationship between these two phenomena is very likely to be reciprocal, although it is impossible to say which comes first in the final analysis. It may well be that American farming draws its vitality and dynamic characteristics, in the first place from a series of factors ....
>
> ... There is nothing to indicate that a similar effort, undertaken in different contexts, in Africa or Asia, will produce the same results.
> (Orivel 1981, pp.34-5)

In contrast, as we shall see, there is a shortage of data on productivity where the unit examined is the individual farm.

3.6 The evidence about costs, like that about effects, is limited and often unsatisfactory. Where costs of teaching adults, or making them literate, are quoted in literature, it is often unclear what is included or excluded. In Somalia, for example, the costs quoted for the literacy campaign are taken from the Ministry of Education's budget and look as if they exclude the major staffing cost, the salaries of teachers taken out of school to teach adults (UNICEF 1978, p.35). As a result we sometimes simply do not know which figures to believe. Ansari and Rege (1964), for example, suggested that in India in 1947-51 it cost 12 rupees to make an adult literate while by 1965/66 Roy et.al (1969) thought it cost 120 rupees. While inflation would account for a change by a factor of two, it would not account for this change by a factor of ten. The evidence on the costs of agricultural extension is no better for here there are remarkably few studies which have looked at the costs of extension and fewer still which have relied on figures for actual expenditure as opposed to budget forecasts.

3.7 Finally, there are a number of inescapable methodological problems in evaluating extension or basic education. Where objectives are long-term, one cannot rely on short-term indicators. As far as basic education is concerned, its objectives are seldom stated in terms that lend themselves to measurement; we usually lack the dubious but convenient yardstick of examination results which are so useful for educational evaluation at higher levels. Furthermore, the very word evaluation implies that we can compare like with like, yet different methods inevitably reach different audiences and make rigorous comparisons impossible. Nevertheless, in the country of the blind the one-eyed man is king, and it is better to base policy on what sketchy evidence can suggest, than to neglect that evidence totally because of its sketchiness.

B. Literacy: methods, effectiveness, costs

3.8 The one area of basic education on which there is a reasonable amount of evidence is adult literacy. Four approaches to this can be distinguished: mass campaigns; the naive postwar campaigns of the 1940s and 50s; Paulo Freire's methods; functional literacy as exemplified by Unesco's Experimental World Literacy Project (EWLP).

3.9 The first mass campaigns were developed in the Soviet Union. Between the revolution and the second world war, the USSR apparently achieved near universal literacy, at least in Russia and probably in the Ukraine. The programme involved the mobilisation of large numbers of part-time tutors, the production of primers, supplementary readers and newspapers for new literates in Russian and a range of other languages, and encouragement, through many of the agencies of a totalitarian state, to participants. More recently, Cuba, Tanzania, Somalia and Vietnam have used a similar approach. In the case of both Cuba and Somalia, schools were closed for the duration of the campaign and both teachers and older school students sent to the countryside as literacy tutors. All these campaigns have in common very strong national support and encouragement to students, and enrolments running into hundreds of thousands or millions. There are parallels between them and the work of Mobral in Brazil: while this is not a state agency, it works on a similar scale and in a country where there are comparably strong pressures to become literate. The illiterate minority in Brazil are left in a cultural ghetto, unable to vote, to get a bank loan, to join the army or to have any chance of a good job in the modern sector.

3.10 After the second world war both Unesco and the British government (for its dependent territories) felt impelled to launch literacy campaigns, but did so with little success. The Soviet achievement - with its stress on supporting materials and on the context within which new literates were

studying - seems to have been overlooked in the planning. In 1964 Unesco's World Literacy Project was abandoned, as in the late 1950s it had been found that only 10-20% were willing to enrol on such campaigns, with subsequent wastage rates up to 50% and a tendency to lapse into illiteracy. (Blaug 1966, p.408). The nearest to an exception in this sad catelogue came in Ghana where the Laubach campaign was the most successful among British dependencies with 129 000 literacy certificates awarded between 1952 and 1957. (Foster 1971, p.590). The period coincides with Nkrumah's building up of the Convention People's Party.

3.11 The main ideological basis for these approaches was a concern for equity - to allow those who had not been to school the opportunities to gain literacy which were open to those who had. In the case of the Soviet Union that concern was associated with the demand for a more educated and more adaptable work force. Paolo Freire's ideological arguments are stronger: that in a society where the powerful have had formal education and the powerless have not, the achievement of literacy is a precondition for increasing the latter's control over their own lives. His method depends upon a culture by culture, even village by village, analysis of learners' interests 'Being able to read successfully three traditional literacy primers will not alter ... a neo-literate's place within that structure' of the peasant's or worker's world.' (King 1979, p.38). Almost by definition, this approach does not lend itself to large-scale literacy programmes, at least in non-industrialised countries. There is little hard data available on the effects of the Freirean approach - although there is plenty on its attractiveness to learners and offensiveness to right-wing governments - and less on its costs.

3.12 In the late 1960s Unesco launched a new literacy programme - the Experimental World Literacy Programme - designed to learn from its earlier failures. A set of carefully planned and monitored experiments were run in a number of countries, with the apparent intention that Unesco or member states would launch into large-scale literacy work again once these had yielded their lessons. The new programme assumed adults wanted not just literacy but functional literacy. The phrase had been used in two senses. First, it implied that literacy primers should be about issues of functional importance to learners (health, the growing of local crops, money). Second, it (later?) came to be used to imply a level of literacy so that, for example, literacy students in Tanzania are classified as literate if they achieve one level in the national tests and functionally literate if they have achieved a higher level. (Kuhanga, 1976/77, p.34). The latter meaning has crept into the dictionary so that Urdang defines 'functional illiterate' as 'a person

whose literacy is insufficient for most work and normal daily situations' (Collins English Dictionary 1979). The Unesco programme is remarkable both because it seems to have cost more, to teach less, than its predecessors and because its spectacular failure has been noticed, monitored and published. That sort of honesty deserves applause.

3.13 The fullest data on the costs of literacy is available from EWLP, from Mobral in Brazil, and for the national campaigns in Somalia and Tanzania. Table 1 sets out the basic facts.

3.14 Leaving aside the Somalia figures, which, as we saw, may well omit staff costs, there are two clear conclusions. First, given the necessary national commitment, it is possible to run a literacy campaign large enough to achieve great economies of scale. In Tanzania, for example, a national and party commitment to the literacy campaign ensured both encouragement to the students, and an organisation to train tutors, distribute materials and even hold national examinations for students numbered in their millions. In the Soviet Union in the 1930s the 8-10% annual growth rate, with the consequent demand for literate workers, coupled with socio-political pressure, provided similar motivations, and a similar political drive to establish an infra-structure for literacy teaching. Given such support, the evidence from Brazil and Tanzania suggests that the cost of making someone literate may be as low as $20-40. The cost per learner in Tanzania in 1975 was estimated at 17s/30 or $2.42. Assuming that a student takes 2 years to become literate we get a cost per student of about $4.80. 15% of those who took the national tests in 1975 reached level IV so, if we make the conservative assumption that none of the rest went on to achieve that level or gained anything from their lower performance, we can estimate the 1975$ cost at 100/15 x $4.8 or $32, or 1978$39. If this figure for success istoo modest by a factor of two, we would get a cost between 1978$20 and $40. Mobral showed a cost per final participant of $15 which suggests that their costs per new literate were of the same order. All these figures omit the opportunity costs of participants' time and may well omit some capital costs and the cost of volunteer tutors.

3.15 But, of course, there are relatively few occasions on which a government, or any other national agency, wishes to launch a campaign on that scale. And, second, the evidence from small scale literacy programmes is dramatically different. In 1966, in the light of Unesco's earlier experience, it was forecast that EWLP would cost '$39-$35-$40'. The figures achieved are sadly different and suggest that costs per successful literate, in 1978$$, may be as high as $525, with costs per final participant of between $120 and 350, while dropout rates are likely to be high.

TABLE 1: Costs and results of literacy projects

Project	Intended audience	Actual audience	Completion rate	Cost per enrolment		Cost per final participant		Cost per examined literate	
				Current Cost $	Constant 1978 $ Cost	Current Cost $	Constant 1978 $ Cost	Current Cost $	Constant 1978 $ Cost
EWLP PROJECTS a/									
Algeria 1967-74	55 000	54 000	70% cycle 1 49% cycle 2	71	112	199	156	n/a	n/a
Ecuador 1967-72	33 000	17 410	50%	70	111	123	194	300	474
Ethiopia 1968-73	73 000	2 000	12.5%	54	85	92	145	212	335
Iran 1967-72	80 000	66 000	40-50%	49	77	76	120	332	525
Zambia b/ 1969-72		10 928	60% (phase 1-2)			169	267	n/a	n/a
Sudan c/ 1970-71									
Textile workers		598	n/a	72	117	221	360	n/a	n/a
Oil and soap workers		553	35%	66	108	192	313	n/a	n/a
OTHERS									
Brazil - Mobral d/ (1972 figures)		4.3 m	52%	4.83	7.63	9.50	15	n/a	n/a
Somalia 1973 e/		1.3 m	73%	0.66	0.95	0.9	1.3	1.1	1.6
Tanzania (1975 figures) f/		5.2 m	77%	4.54	5.58	5.90	7.25	16	20

a. The figures for Algeria, Ecuador, Ethiopia and Iran are from Unesco (1976); a 1972 deflator has been used to convert to 1978 $$. The figures include capital costs but it is not known how these have been calculated.

b. We have taken K141 as $169.

c, Literacy work (1974), pp 103-5

d. Unesco Regional Office (1975) p.27

e. UNICEF (1978) pp 34-5

f. Kuhanda (1976-77) p.34

C. Agricultural extension: methods, effectiveness, costs

3.16 As we saw, agricultural extension services vary widely, and along a variety of different dimensions. As a step towards a typology it is useful to distinguish four models: the master farmer system; the traditional or take it or leave it approach; a structured system; and contract farming.

3.17 (a) Under a master farmer system, extension agents concentrated on a small, selected number of master farmers and trained them, working on the assumption that their influence would introduce new pratices to their neighbours. It did not work and in practice meant that more resources went to the rich farmers than the poor, without much general raising of the standard of agriculture. Probably no-one liked it:

> 'the Service began a vigorous campaign of designating good farmers and citizens in communities as Master Farmers. Often these had been effective leaders in their groups and people never thought of themselves as exceptional, except that they were good farmers and always helpful to others. When they were publicly acclaimed as Master Farmers, it sort of set them apart. They were often not much good as local leaders any more.' (Loomis and Beegle 1957, p. 134).

(b) Under the traditional approach 'peasants are brought innovations and information which they are free to accept or reject' (Lele 1975, p.64). Critics of this approach suggest that extension agents are themselves too free to visit or stay away from farmers.

(c) As a result, various attempts have been made to impose a more rigidly structured system of visits and of reporting on extension agents. The PIM system in Kenya (cf. Chambers 1974) and the Training and Visit system developed by the World Bank are examples. (cf Benor and Harrison 1977).

(d) Even tighter supervision is exercised under contract farming. The 79 000 farmers of the Kenya Tea Development Authority, for example, are selected, trained, graded and controlled by the Authority who provide seedlings and buy the green leaf. (cf. Phillips and Collinson 1976, pp.342-3)

3.18 As we are concerned with the effects of extension, rather than of rural development projects more broadly, it is necessary to seek evidence on these four approaches from studies which focus on the farmer as the unit of observation. For, as Orivel has pointed out, more general studies comparing yields in development projects do not 'permit the measurement of yields specifically attributable to the extension service'. (Orivel, 1981 p.40). Table 2 sets out the findings of such studies in third world countries.

Table 2: Studies of effectiveness of agricultural extension

Country	Date of study	Type of extension service	Results
Botswana a/	1967/8	Master farmer	Benefit/cost ratios of: 3.33:1 at 8% discount rate in Barolong 1.66:1 at 15% rate area. 1.33:1 at 8% discount rate in SE generally. 0.67:1 at 15% discount rate. Contact mainly with wealthier farmers. Correlation of +.194 output and exposure to extension.
Brazil b/	1973	Traditional	Extension visits positively related to productivity in 5 samples but significantly so only in one.
Brazil b/	1976	Traditional	Productivity falls significantly with number of contacts.
India (Punjab and Haryana) c/	c 1972	Traditional	Research could not find yard-stick by which to measure extension effort
India d/	1971	Agricultural extension generally	Negative correlation between the length of time an extension service has existed and output
Kenya e/	1970-72	PIM (structured)	Agents spent 57-66% of time visiting farmers, contacting 20.3 per month. More visits paid to wealthier farmers.
Kenya (Tea Development Authority) f/	c 1973	Contract farming	Three-fold increase in production; agents visiting each farmer 6 times annually.
Kenya b/	1973	Traditional	Positive but not significant impact of extension services.
Kenya b/	1974	Traditional	Productivity increases significantly with number of visits up to 4-7, then stagnates.
Malawi f/	1972-73	Agricultural extension in intensive project	Extension visits positively and significantly associated with higher yields of maize but not of groundnuts.
Malawi g/	1980	Traditional	Extension visits positively but not significantly associated with production of both maize and groundnuts.

Nepal b/	1980	Traditional	Non-significant positive effect for 2nd rice crop and very slightly significant positive effect for winter wheat.
Philippines b/	1963/73	Traditional	Number of contacts with farmers significantly increases productivity in two instance but not in third
South Korea b/	1975	Traditional	Extension activities significantly increases technical and economic efficiency of farmers.
Thailand b/	1977	Traditional	Attendance at extension classes significantly increases productivity.
Thailand h/	1978	Traditional	Significant positive correlation between visits and productivity for farmers using fertilisers; negative but not significant correlation for farmers not using fertilisers.

Notes:

a. Lever 1970
b. Orivel 1981
c. Chaudri 1979
d. Brown 1971
e. Leonard 1977
f. Lele 1975 and Phillips and Collinson 1976
g. Perraton, Jamison and Orivel 1981
h. Lockheed, Jamison and Lau 1978

3.19 There are two striking omissions from table 2. First, it omits evidence from the Training and Visit system, although this appears to have had a striking impact on yields. It does so because the available studies, on Madhya Pradesh, Rajasthan and West Bengal, for example, do

> not permit a judgment to what extent these yield increases and technological improvements were due to extension alone and how much to other inputs or investments. In each of these cases, however, inputs were available at more or less the same level before the introduction of the reformed extension service but were not widely used. Nor did the availability of irrigation increase substantially. The only major change was in the extnesion service itself, strongly suggesting that extension had a catlytic effect on boosting yields.
>
> (Benor and Harrison 1977, p.45)

3.20 Second, with few exceptions, the studies have little data on the costs of extension.

3.21 Four conclusions emerge. They should be seen in the light of the quantity and quality of the information available. In view of the scale of agricultural extension, and the significance of extension service to many third world countries and in the budgets of many ministries of agriculture, there is remarkably little hard evidence on its costs and on its effects.

3.22 First, agricultural extension can be successful in carrying information to farmers and in raising their productivity. Evidence of its success is, however, seldom dramatic and it is by no means clear that it will always have a favourable benefit:cost ratio.

3.23 Second, the Training and Visit system has had successes in a number of cases, but it may not be of universal relevance. Where it has achieved successes so far, there have been relatively simple, and cheap, changes which farmers could make and which would yield clear benefits in a short time. Many desired agricultural changes are more complex, or have benefits available over a longer time scale.

3.24 Third, the tendency of extension to contact mainly the richer farmers is confirmed in a number of studies.

3.25 Fourth, the scale and costs of much agricultural extension is such that it could not be scaled up so that all farmers got the attention which is at present lavished on a fortunate minority. As Lele pointed out, in relation to the intensive Kenya Tea Development Authority and Malawi Lilongwe Land Development Project, 'without a very major commitment of resources by national governments to rural development and, equally important, to suitable training of the manpower necessary for the expansion of these services, intensity of most of these programs cannot be replicated on a large-enough scale to reach a mass of the rural population in the foreseeable future.' (Lele 1975, p.69)

IV USING MASS MEDIA

4.1 We now turn to the experience of the third world in using mass media as a support, and as an alternative, to orthodox basic education and extension.

4.2 The evidence on mass media is patchy. It covers a variety of projects, ranging in their intentions from teaching narrow skills, as in much agricultural extension, to a basic curriculum, as in some of the radio schools of Latin America. Where results seem applicable to this study, we examine projects whose aims went beyond basic education as we have discussed it. A further difficulty in interpreting the literature arises from ways in which mass media have been used in different countries and different continents. Some patterns of use, for example, have developed only in a single continent which forces us into extrapolating from the experience of one continent to another, and making intellectually uncomfortable comparisons between continents.

4.3 Findings are also limited by the measures which researchers have used in considering the effects of mass media. In ascending order of sophistication, researchers have used measures of four kinds:

- effort: measuring output in such terms as the number of programmes broadcast or the number of publications printed;
- reach: measuring the size of the audience reached and, sometimes, its nature (e.g. age, sex, socio-economic status);
- knowledge gain: measuring whether participants in a programme have learned from it;
- effect: measuring the direct effects of a programme (e.g. by crop sampling to see whether participation in an extension programme raises agricultural productivity).

4.4 In this chapter we look in order at the use of mass media when linked when group study, at its use with feedback for individuals, at radio, and at rural newspapers.

A. Mass media with group study

4.5 Learning groups, usually supported by radio, have been organised in a number of different ways. The earliest pattern of organisation came from the radio farm forums of Canada. Groups of farmers met together once a week over a number of months or years to listen to the radio programme, discuss it, and then go on to act on its advice. Later farm forums were established in India and Ghana and in other countries of Africa and Asia, with mixed success. A different kind of organisation was developed in Latin America with radio

schools. Each school is a group, usually of adults and often based on a single family, who study an organised curriculum by listening to the radio and following printed lessons. The schools are supported by central, non-government, organisations such as ACPO (Cultural Popular Action) in Colombia, which have, for the most part, been established by the Roman Catholic Church. Both farm forums and radio schools are expected to run for a number of years. A different kind of group study has been developed in Tanzania - the radio campaigns. Here, efforts are made by a wide number of government and party organisations to set up a very large number of learning groups, embracing a significant proportion of the adult population, but for these to work together only for two or three months. Campaigns have been used for political, health and agricultural education in both Tanzania and Botswana.

4.6 Radio schools. There are some 25 radio school organisations in Latin America. Their intention is to teach people to read and write and these provide a basic education, geared to the interests of rural adults. Agriculture is an important component of much of their teaching. Detailed case studies have been published on three radio schools, ACPO in Colombia, ACPH in Honduras and Radio Santa Maria (RSM) in the Dominican Republic. We concentrate mainly on these three institutions, but look also at evidence from others, notably from ERBOL in Bolivia and Radio ECCA in the Canary Islands. All radio schools have broadly similar methods of working, which derive from those developed by ACPO, which was established in 1947.

4.7 ACPO was set up by a priest, (now) Mgr Salcedo, a radio amateur, who wanted to use radio in order to reach his congregation. ACPO's aims are:

> '(1) motivation of the campesino or rural farmer for development; (2) human promotion or education of the whole man; (3) integration of the campensino into society; (4) organisation and development of the community especially by participation in local organisation; (5) productivity of the campesino in his agricultural work; (6) spiritual development of the campesino in his personal life.'
> (McAnany 1975, p.245)

4.8 ACPO, and other radio schools with similar aims, have interpreted these to mean that their curriculum should combine the secular - basic reading and writing and the elements of health and agriculture - with the religious.

4.9 Each radio school organisation consists of a network of learning groups, which are supported by monitors, and provided with teaching material both in print and over the radio. The groups are often based on a single family. They meet once or more often a week, listen to a radio programme, and work through correspondence lessons sent to them from the headquarters of the radio school. Each group has a leader as a member of the group, who must be able to read and write, and who helps the others learn. As the radio school movement was started by the Roman Catholic church, and remains supported if

not dominated by it, the local priest often plays a key role in encouraging the establishment of radio schools and in helping to maintain them. In Colombia, for example, 'groups are more successful where the parish priest is sympathetic, and where he is relatively young. If he is too old he cannot easily climb up the mountains to visit nearby schools.' (Young et al. 1980, p.98). Monitors also support groups: in most cases these are volunteers, who are paid a small amount by the radio school, and trained in the work of helping groups. The RSM monitors meet their groups once a week, act as a channel for sending school-members' work back to headquarters, and retain a proportion of the fee which members pay and which they collect. In Colombia there is a more complex structure with a hierarchy of monitors and supervisors, who are trained in short residential sessions by ACPO at its headquarters. But in all cases the monitor's function is different from that of a teacher: it is not to teach the subject matter of the courses, but to guide a learning group, with its own member/leader, on using the radio programmes and printed study materials.

4.10 How successful have the radio schools been. McAnany has suggested that there are two common problems in answering this question:

> '(1) The goals of the projects are often so vaguely stated that it is difficult to pin them down to see whether they have been achieved. If a radio school proposes to create the "new Latin American man" among its audience, the task of defining the goal and estimating its accomplishments often prevents any real performance evaluation. (2) Project directors frequently (and often sincerely) confound effort and performance; thus they will say they have accomplished a good deal in creating a radio station, developing programming, printing study guides and training monitors and supervision. All this is true and an evaluator seems ungrateful if he presses on to ask how many people have become literate through the process; yet that is a performance question.' (loc. cit.)

4.11 A third difficulty arises from the radio schools' different perception of their role. In many Latin American countries there are severe limits to the change which education can make to campesinos' lives in the absence of land reform. Radio schools have therefore been faced with questions about their role as reforming or revolutionary institutions. For its part, 'ACPO considers it beyond its jurisdiction to promote peasant organisations with vindictive purposes. "We leave politics to the parties," says Monseñor Salcedo.' (Beltran, 1976, p.239). In contrast, MEB in Brazil was committed to structural change aimed at economic and social reform: after the military take-over it was effectively closed down. In Honduras, ACPH has tried to steer a path closer to structural change than ACPO's without jeopardising its actual existence.

4.12 It is therefore difficult to gauge how far radio schools have met their own objectives but we can try to answer three simpler questions: who have

they taught? did their students learn anything? did it make any difference to their lives?

4.13 First, as to numbers. Where, as in Colombia, radio schools are broadcasting and distributing a newspaper, it is important to distinguish between the numbers enrolled for courses and the, generally larger, numbers listening to radio programmes or reading the newspaper. Enrolment figures for ACPO, ACPH and RSM are given in Appendix A. Enrolments have varied from year to year but as a rough figure we can assume that they lie between 110 000 and 180 000 annually for ACPO, between 10 000 and 17 000 for ACPH, and between 12 000 and 23 000 for RSM. Using figures for 1979/80 we can make a very crude comparison between enrolment and target audience, as in table 3.

Table 3: Proportion of rural adult population reached by radio schools

Country	Total population (millions)	% aged 15-64	% rural	Estimated total rural population aged 15-64 (millions)	Radio school enrolments as proportion of rural adult population
Colombia	25.61	56	30	4.3	2.6 - 4.2%
Honduras	3.4	49	64	1.07	0.9 - 1.6%
Dominican Republic	5.1	51	49	1.27	0.9 - 1.8%

4.14 If we assume an enrolment of between 110 000 and 180 000 for ACPO, of between 10 000 and 17 000 for ACPH and 12 000 and 23 000 for RSM this suggests that they are, in any one year, reaching the following proportion of rural adults:

ACPO 2.6 to 4.2%
ACPH 0.9 to 1.6%
RSM 0.9 to 1.8%

These figures tally with the more limited figures from Radio ECCA in the Canary Islands: in 1975 they had 20 263 students in a total population of 1 167 524. If we assume that 40% of the population are rural adults, then Radio ECCA is reaching some 4.3% of them. (For its part, it estimates that it taught 10.12% of the total population between 1965 and 1975.) (Espina 1976).

4.15 Brumberg (1975 p.35) estimated that 'ACPO may have reached roughly 4.5% of its potential rural audience in 1968'. The figures are necessarily crude, and assume - wrongly - that radio school students are all adults. But they are near enough the same order of magnitude for us to be fairly sure that radio schools can, in any one year, enrol between about 1% and 5% of their target population, the rural adults.

4.16 Unfortunately, we know rather less about who these students are, in terms of their age, sex or income. The literature on ACPO confirms that the majority

of its students are peasant farmers but are not the poorest members of society. We have fuller information about RSM in the Dominican Republic. The students there have a median age of 18.4; 56.9% of them are women and 84% of the total live in the countryside.

4.17 We know something about their wealth. In Colombia ACPO attracts very few landless peasants (Brumberg 1975, p.39). Radio Santa Maria, in the Dominican Republic, had considerable though limited success in reaching the landless and those with the smallest holdings. White concludes that RSM students have a somewhat higher socio-economic status within rural communities (though not within the larger national social status system). (White 1976a, p.25) Evidence from Bolivia confirms that radio schools can reach the poorer members of society; 63% of ERBOL's literacy students in 1976 and 83% of its second and third year students had an Amerindian language as a mother tongue and we can therefore assume that these were generally poorer than speakers of Spanish. (Detailed figures are in Appendix A.) In general, therefore, radio schools have considerable success in reaching poor members of peasant communities but seldom reach the poorest.

4.18 How far did the students benefit? The fullest information is from ACPO. Their own figures suggest a fair success in their literacy teaching: between 1960 and 1968 they enrolled 800 385 illiterate students, 48% of them women; 278 948 or 35% of the total learned to read and write. (Brumberg 1975, p.37). Over the period from 1961 to 1968 between 61% and 85% of those who enrolled on the correspondence course and took their examination succeeded in passing it. Perhaps more important, from 1962 to 1966 the proportion of students taking the examination remained constant at between 53 and 56% - a high completion rate. (ibid. p.38) For reasons that Brumberg does not explain, the completion rate fell to 26% in 1967 and 22% in 1968.

4.19 There is suggestive evidence that ACPO does change its students' attitudes: studies have been consistent in reporting that ACPO students score higher on measures of modernity, on knowledge of and attitudes towards innovation, and on their integration in the community as measured by such things as membership of co-operatives. The evidence is not conclusive, and differences between ACPO students and others cannot be attributed solely to membership of ACPO. Musto (1971, p.180), for example, found that peasants' modernity was more closely related to the socio-economic level of the region than to the influence of ACPO, while their innovativeness was as closely related to the socio-economic level of the region as to ACPO. Nevertheless, in the same region, ACPO students were consistently more

innovative than non-students. Brumberg compared two communities, one highly influenced by ACPO and one hardly touched by it and, while he did not have the data for a rigorous comparison, found similar differences. In the area influenced by ACPO he found more household improvements, such as latrines and fences and more children vaccinated than in the other. He also found 57% of farmers claimed an increase in agricultural productivity in the previous three years, compared with 34% in the other community. Thus, such evidence as there is all points the same way in suggesting that ACPO does have an influence, necessarily difficult to quantify, on its students.

4.20 This must be seen in context. Schramm and Lerner have suggested that, while ACPO members have learned from their courses, they have not taken the lead in educating and mobilising others. ACPO has been more successful in fostering individual development of its students than in helping towards structural change in society (cf Beltran 1976, p.236 ff) and its appeal seems to have been to the more traditional rather than more radical peasants.

4.21 The evidence from Honduras and the Dominican Republic is consistent with that from Colombia in suggesting that radio schools can more easily teach the subject matter of basic education than promote more far-reaching changes in their students' lives. For four years in which Radio Santa Maria was offering a basic education course roughly equivalent to primary school, its students achieved the results shown in Table 4.

Table 4: RSM students 1971/2 to 1974/5

	Enrolled	Took examinations		Passed examinations	
		no.	%	no.	%
1971/72	12 238	6 823	55.7	5 813	85.2
1972/73	22 375	15 694	70.1	13 915	88.7
1973/74	20 171	11 690	58.0	10 476	89.6
1974/75	20 109	13 790	68.6	11 936	86.6

Source: White 1976a, pp.54-5

Completion and pass rates are high. These are similarly high for ERBOL in Bolivia and Radio ECCA in the Canary Islands. Moreover, White established that

> 'Students in grade 6 and 8 in the basic education programme of Radio Santa Maria have higher median scores on the certificate examinations than equivalent grade levels in the official system using conventional classroom methods when the field teachers of Radio Santa Maria are functioning at least adequately.'

The basic education programme had broader objectives but was less successful in meeting them than in teaching the content of the basic education programme and had little effect on students' social, political, religious and family attitudes. (White 1976a, p.82)

4.22 In Honduras, ACPH had limited success in teaching literacy through radio school methods. Where students had no previous schooling, less than 30% achieved even minimum functional literacy in one term although 75-90% of those who had been to school - even if they had later forgotten to read and write - did reach this level. (White 1976b, pp.44-7). ACPH set up a Popular Promotion Movement (PPM) which was teaching about health and agriculture, as part of basic education. PPM had some success in teaching peasants about health practices and agricultural methods but less in encouraging their adoption.

> 'the PPM, through the radio schools and other means of communication, has been successful in communicating a level of agricultural and health knowledge to its participants which is above that of the general campesino population, even though the non-PPM control group in this case included some relatively modernised communities. However, the discrepancy between agricultural knowledge and practice among radio school students and PPM participants in general suggests that the overall conclusion that participants are gaining knowledge skills but not applying them in concrete circumstances of life appears to be true also with regard to agricultural education'
>
> (White 1976b, p.87)

Health education, on the other hand which was linked with the activities of homemakers clubs, appears to have been more effective and White found a correlation of .445 between the length of radio school membership and health practice (ibid. p.94). He concludes:

> 'First, the campaigns of the radio schools, in conjunction with the homemakers' clubs, have emphasized preventive practices which are within the reach of most socioeconomic statuses and do not require any credit support or more sophisticated technical knowledge, as do yield-increasing agricultural inputs. Secondly, the presence of the health centres in the rural central-place towns and the occasional visits of vaccination brigades from the regional hospital supported the radio school and homemakers' club efforts and made vaccination and prenatal care more feasible. Thirdly, the homemakers' clubs have encouraged the direct implementation of health practices by creating a social force in the community motivating women the implement health practices, by maintaining a supervisory and technical assistance system directed toward solving the concrete problems of rural women, and, in some cases, by providing credit, medicines, and other supplies in the local community'.
>
> (ibid. pp.94-5)

4.23 Radio schools, then, have succeeded in attracting between about 1% and 5% of rural adults annually. In addition to these, their radio programmes and newspapers have reached much larger eavesdropper audiences. They have established organisations which can serve students in their thousands, and have developed a method of teaching which achieves a fair measure of success in educational terms. In other words, radio school students have relatively high results in terms of examination results or promotion from the equivalent

of one school grade to the next. The schools appeal to a significant proportion of relatively poor peasants, though seldom to the poorest. They have been less successful in achieving any major transformation of their societies.

4.24 Farm forums. As we saw, there is another major style, or tradition, of linking broadcasts with group study - that of the radio farm forum. The idea goes back to the Canadian farm forums which existed from 1940 to 1965. Their motto was 'Read, listen, discuss, act'. Groups of farmers met together to read an explanatory pamphlet, listen to a radio broadcast, discuss it, and act together in the light of their discussions and of the information they had received. The intention was to combine local energy and activity with information and support which came by radio and by print. The original groups were set up with advice and support from the Canadian Adult Education Association and the Canadian Federation of Agriculture while the broadcasts were made by the Canadian Broadcasting Corporation. Feedback from groups was used in making programmes.

4.25 Since then forums have been widely established in Asia and Africa as a way of teaching farmers. In Francophone West Africa radio clubs influenced by the French tradition of animation have been established and run on very similar lines. Forums or clubs have been reported from India, Pakistan, Thailand, Nepal, Ghana, Benin, Nigeria, Zambia and Senegal, though there is rather less information about their extent and their effects. Table 5 sets out the reported facts about clubs and forums.

Table 5: Radio Forums and Clubs

Country	Date forums established	Number of forums
Dahomey a/	n/a	600 (1972) 700 (1975) b/
Ghana	1962	200 (1968) 300 (1971) c/
India	1956	22 500 (1977) d/
Niger e/	1962	42 (1966) 78 (1972) g/
Senegal	1968	57 (1969) 270 c(1971) h/
Togo	1964	152 (1966) i/
Zambia	1967	630 (1973) j/

Notes:

a. McAnany 1972a
b. Dicko 1977
c. Donkor 1979
d. Khan 1977
e. McAnany 1972b
f. Lefranc 1967
g. 28 clubs and 50 learning groups
h. Cassirer 1973
i. Kahnert 1967
j. Edington et.al. 1974

Forums generally seem to have attracted 10 to 20 members each. But they have not grown into a mass movement: nowhere does the membership of farm forums reach anything like the proportion of the target population reached by radio schools. A partial explanation for this seems clear. There is ample evidence that the field organisation to support forums is crucial to their success. In his analysis, for example, of the Indian forums, Schramm points out that the trial forum project in Puna in 1956, which was much more successful than its longer follow-up, had much more generous field staffing. (Schramm 1967, pp.110-120). In Canada the forums could rely on support from both the farmers' union and the adult education association. In Zambia extension agents have had the job of supporting farmers while in Ghana a specialised staff travelled round to support existing forums and encourage the establishment of new ones. But this kind of support inevitably imposes another burden on government field staff and on government finance. Governments have not generally been so convinced of the value of forums that they have been willing to finance extensive field support for them. In Uttar Pradesh in India, for example, the government was not able to appoint even one forum organiser for each district with a population of nearly 2 000 000. (ibid. p.120). At the same time, as forums have usually been established by government agencies, they have not built up the networks of voluntary and part-time workers who support radio schools. In practice, then, governments have not been convinced of the value of forums. They may or may not be right. To assess that, we need to ask questions about the nature as well as the size of forum audiences and about the effects of forums.

4.25 The original forums in India attracted illiterate as well as literate members and members who were willing to go on attending meetings. Two-thirds of them attended 18 out of a possible 20 meetings. (Studies of the larger scale forums, set up after the first trial, suggested that only half of the nominal members then attended regularly. This is a similar finding to that in Ghana where about half the members attended half or more of the meetings.) (Abell 1968, p.44) A study in Ghana in 1964-65 found that 54% of forum members were women and 37% had never been to school; 53% were not literate; threequarters of them were primarily engaged in farming. Village leaders had been asked to recruit forum members with the intention that they should represent a cross-section of the population. As in 1960 literacy throughout Ghana is reported as 27% it seems that forums did have some success in appealing to the least educated people in villages but only limited success (ibid. pp.29-32). In Senegal it was found in 1969 that literacy groups were broadly representative of their villages although no fuller details of the membership were provided (Cassirer 1973, p.42). Membership is of course

dependent on the local culture. In Senegal men and women sit separately as they listen to broadcasts and the reports do not say how far each group contributes to discussion. In Niger, however, less than 10% of forum members are women. (Rondeau 1973, p.71). So far as it goes, the evidence is consistent that forums are as successful as other methods of education in teaching a cross section of the adult audience. It seems likely that their membership is less skewed towards the wealthy than, for example, the work of extension agents.

4.27 We turn to their effects. Some forums have none; reports on forums in India for example, make it clear that some of the forums which exist on paper no longer actually meet. And of course effectiveness depends on how well they are run. Experience in Zambia has suggested that

> 'The Chairman chosen is usually an elderly man who commands respect of the villagers whilst the Secretary is generally chosen from the ranks of the younger literate men. Experience has shown that these appointments are often critical and that it is as unsatisfactory for the villagers to elect their officials as it is for the Extension officer to appoint one. A selection compromise seems to be the answer.'
>
> (Edington et.al, 1974, p.208)

We can distinguish two sorts of effect. First where forums have been established with an effective two-way communication system then 'a channel of communication exists between the Ministry and many of the farmers which is immediate and reliable'. (ibid. p.212) Similarly, in Senegal Radio Educative Rurale has been seen as valuable because it provided a channel through which the views of peasants could be made known to the highest level of government. It has also been criticised as a palliative which reduced peasant opposition while little was in fact done about their economic and social disadvantages. Nevertheless the evidence is clear that a forum organisation can facilititate communication between government and the field.

4.28 Second there is some evidence about more direct results in the countryside. The first experiment in India showed that forum members did learn as a result of their attendance: there were significantly greater gains in learning among forum members than among a control group, while illiterate members gained more than literate. Forum members also reported on decisions they had taken about action. Groups intended for example to make compost, or to dig a well, or sell milk through a co-operative, or to use rat poison while conserving rat-killing wild animals. (Schramm 1967, pp.114-6). In Ghana, surveys were carried out before a 20 programme series of farm forum meetings and six months later after the series. Villages with farm forums were compared with a control group. It was found that 'ten of the fifteen subject matter broadcasts showed evidence of the positive influence of local

village listening discussion groups (The Forums). Desired knowledge, action or attitudes were present among 10% to 27% more of the respondents' in forum villages than in the controls (cf. Appendix A and Abell 1968, p.35). While this was a modest study, conducted for a short period, it does seem to confirm the efficacy of farm forums, both for increasing the farmers' knowledge and for promoting the adoption of innovations, though some of their findings might be attributed to a Hawthorne effect. The evidence is thinner than we would like. As Edington et. al (1974, p.211) say of the Zambia farmers:

> 'whether the service helps to increase agricultural and livestock production is a question at present impossible to answer ... there is no doubt that this service is making an important contribution to the morale of the farming communities. What might, perhaps, be undertaken one day is a survey of activities which individual farmers claim were inspired by farm forum broadcasts. One thing which is clear is that many farmers find it difficult to sustain these activities. In Zambia again for example, of 29 forums examined in 1973, 14 were meeting regularly, 7 'seemed to be urgently in need of considerably more supervision' and 4 'appeared to be virtually defunct'.

4.29 We can sum up:

- Forums have reasonable success in attracting a cross-section of their potential audience.
- They have failed to attract sufficient support from governments for them to expand to the point where they reach significant proportions of the population.
- They provide a two-way channel of communication between government and farmers.
- There is evidence that farmers learn through attending forums and make changes in their methods as a result.
- We do not know enough about the attractiveness of the farm forums where most farmers own their individual radios.

4.30 Radio campaigns demonstrate another way of linking group study with the use of radio and print. The campaign method was originally developed in Tanzania in the late 1960s and early 1970s. Groups met for between two and four months at intervals of once or twice a week and listened to a radio programme. Each group had a group leader who had been trained in his role of guiding the discussion and a secretary who sent back reports on the group discussion to the campaign organisers. Whereas radio schools and farm forums have reached only relatively small proportions of the population, the aim of radio campaigns was always to involve very large numbers. The consequence of this was that a large number of political and national organisations were pressed into service to support the work of campaigns. A large organisation

had to be created in order to deliver printed materials to group leaders, to train those leaders, and to handle feedback from the groups. Tanzania used both its adult education organisation and its party organisation for this purpose. In Botswana, which is a multi-party state, political organisations were not used but a whole variety of government departments co-operated in supporting the work of groups. Table 6 sets out the basic facts about the campaigns in Tanzania, and in Botswana which followed the Tanzanian example.

4.31 The early campaigns in Tanzania were all on political or civic education. The first large scale campaign in 1969 aimed at explaining to people the second five-year development plan and this was followed by campaigns on national elections and on a variety of civic issues which seemed of importance to government at the time when it was celebrating 10 years independence. In 1973 with the campaign on health there came a change: the emphasis now was not only on education but also on practical activities which people could undertake. The campaigns on health education in 1973, on nutrition in 1975, and on forestry in 1981 were all intended to leave behind practical monuments in the countryside in terms of better health practices, better nutrition and more trees.

4.32 The model was transported to Botswana in part as a result of one adult education professional moving from Tanzania to Botswana. Here, too, the first campaign in 1973 had a political theme and its intention was to inform people about the national development plan for 1973 to 1978. The 1976 campaign introduced a variant: the Botswana government was developing a new policy for the use and management of tribal grazing lands, which covered a very large proportion of the country's surface area. One of the purposes of the campaign was to consult the public about the way in which the policy should be implemented, area by area and district by district. Feedback from groups was used to guide the developing policy by regionally and nationally. This national campaign was followed three years later by a local campaign in the western Kalahari, whose aims included both informing people about the district development plan and consulting them about local development issues. The purpose was to provide feedback to local rather than central government.

4.33 There is a fair body of literature on the campaigns, so that it is possible to write with some certainty about their audiences, the extent to which participants continued to attend group meetings, how much they learned, and what results the campaigns had in villages. We look at each of these questions in turn.

Table 6: Principal radio learning campaigns in Tanzania and Botswana

Title and content	Date	Length	No. of groups	No. of people	% age women
Tanzania					
To plan is to choose (Kupanga ni Kuchagua) Second 5-year development plan	1969	8 x ½ hour programmes	1 600	n/a	n/a
The choice is yours (Uchaguzi ni Wako) National elections	1970	1 month	n/a	4 000	n/a
A time to rejoice (Wakati wa Furaha) Celebration of 10 years of independence	1971	10	n/a	20 000	38
Man is health (Mtu ni afya) Health education	1973	12 weeks	75 000	2 million	49
Food is life (Chakula ni uhai)	1975	4 months	n/a	over 2.5 million	n/a
Forestry	1981	5 months	n/a	n/a	n/a
Botswana					
The people and the plan (Setshaba le Togamaano) National Development Plan 1973-78	1973	10 programmes in 5 weeks	1 432	12 000	n/a
Our land (Lefatshe la rona) Government plans for use of tribal grazing lands	1976	10 programmes in 5 weeks	over 3 000	55 300	50
Learning about government (Lesedi la puso) Regional campaign of civics education	1979	10 programmes in 5 weeks	257	3 060	n/a

4.34 First it is clear that the campaign technique can reach very large audiences indeed. Starting on a fairly modest scale, the Tanzanian campaigns built up to the point where they were numbering participants in their millions. With figures of this size one cannot expect precision but the Tanzanian experience suggests that one can reach between one in five and one in ten of the adult population in this way. In Botswana the second campaign, which had very much fuller support from government than the first, reached 18.5% of the adult population.

4.35 The campaigns also had reasonable success in reaching the less educated and poorer members of society and reaching people in the countryside. And as time goes on campaigns seem to have become more successful from this point of view. Thus in Tanzania while 'A time to rejoice' had 72% of farmers among its audience the figure for 'Man is health' was between 90 and 95%. In Botswana the campaign in 1975 reached 9% of the total rural population as compared with 3% of the total urban population. We get a similar picture if we look at the schooling which radio campaign participants had received. 31% of the participants in 'A time to rejoice' had received five years or more of education while this figure drops to 18% for 'Man is health'. In Botswana we have figures just for 'Our land' where 37% had received no education, 31% had been to school for 1 to 4 years and 32% had been to school for 5 years or more.

4.36 Evidence about the economic status of participants is thinner. However questions were put to participants in Botswana in 1976 on their ownership of cattle. This is an issue so sensitive that the results must be treated with some caution but 40% of participants claimed they had no cattle at all. This exactly reflects the proportion of households without cattle in the country generally.

4.37 Where we have evidence, the campaigns seem to have been more successful in attracting men than women. 'A time to rejoice' had only 38% women in its audience but this figure rose to 49% for 'Man is health'. In Botswana in 1976 the sexes were more or less evenly divided. However, as 58% of the population in Botswana were women, recruitment was in fact biased towards men.

4.38 Thus we can conclude that the campaigns had considerable success in reaching the poorer members of society but not complete success. In Botswana for example in 1976, 61% of group members were literate - a higher percentage than one would expect in a random sample of the adult population. In the regional campaign there in 1979, while we have no detailed breakdown of the audience, the report does show that relatively few of the Basarwa, often the poorest group in society in the western Kalahari, participated in it.

4.39 Of course not all participants attended all meetings. Generally it seems that people went to about two-thirds of the total. In 'A time to rejoice' the average was 65%; it was 63% for 'Man is health' and 61% in Botswana for 'Our land'. More seriously Matiko (1976, p.14) reported that from a small sample 34% of the groups working on 'Food is life' in fact broke up. And there is evidence that even over the short period during which campaigns were running participants stopped coming to meetings. There is a significant drop-out rate even for short campaigns. With 'Man is health' the audience fell most steeply between the first and second weeks and there was then a decline by a further 10% in all from the second to the tenth week. There was a rather higher drop-out in the regional campaign in Botswana in 1979 with 49% of the audience dropping out between programme 1 and programme 10. While the figures are not out of line with those for adult education classes in Botswana or Tanzania generally, they are high enough to be worrying in view of the very short period of time over which campaigns were running.

4.40 The evidence is consistent that participants did learn from taking part in radio campaigns. In a number of campaigns pre- and post-tests were administered and it was found that there were learning gains among participants and, where significance tests were applied, that there were significant differences between those who had attended learning groups and control groups. In a number of cases, however, we have no such data. For 'Our land' for example, information about people's background knowledge of the subject of the campaign was collected before it began, but no follow-up study was done.

4.41 Where we have figures they are consistent and impressive. Thus for 'A time to rejoice' comparisons were made between groups using a pre-test and post-test measure of knowledge. There was a difference in mean score between pre- and post-test results of 11% (means of 72% and 83%). This is significant at a better than .01 level. (Hall 1972, p.47). For 'Man is health' Hall examined both pre-test and post-test scores of groups participating in the campaign and compared these with control groups who were not participating. He found a rise of score from 42% to 63% (significant at the .01 level) for pre- and post-test scores of participating groups. He also found a difference between the scores of 28% for the participating control groups which was significant at the .05 level (Hall 1978, p.52). Pre- and post-tests were also carried out in Botswana for 'Learning about government' and the report concludes that 'most questions asked in the surveys revealed a moderate gain in knowledge. The proportion of people giving correct answers to the factual questions generally rose by 10 and 20% points. Gains in knowledge were greater for those who stayed with the campaign until the end'. (Boipelego Education Project, nd, p.112). Unfortunately no significance tests were carried out here but the evidence is consistent with that from Tanzania.

4.42 The later campaigns in Tanzania aimed at making changes in everyday village life and tests of knowledge gain are thus an inadequate measure to assess their success. We have the fullest information on the results of 'Man is health'. The evaluation team in Tanzania carried out a detailed survey of health practices in sample villages before and after the campaign with the results shown in Appendix A. The team established that the campaign did result in measurable changes in health practices in the villages surveyed. Hall goes on to report that 'on a national basis, the digging of pit latrines proved the most successful single activity of mtu ni afya' (Man is health). His table is reproduced in Appendix A. He also noted that 'the average rate of latrine use increased 123% in the eight villages'. (Hall 1978, p.58-9). A later survey suggests that after four years latrine usage generally had increased to include 59% of the population and suggests that some of this increase, taking place over a period of years, should probably be attributed to 'Man is health'. (Maliyamkono et.al 1978, p.79).

4.43 Campaigns, then, can leave physical monuments in the countryside as well as reports of learning gains in the researchers' documents. 'Our land' in Botswana had one quite different aim: to consult people about a government programme and provide information from those people to district and central government. The evidence is clear that the campaign did result in feedback from the learning groups to government: 25 000 report forms, 70% of the maximum possible number were submitted during the campaign. The Ministry of Local Government and Lands Report on the campaign records that 'Government, which required that there should be a public consultation on the TGLP policy proposals, is satisfied with the campaign's achievements and is making use of the data produced by the consultation'. (Ministry of Local Government and Lands 1977, p.124). No further details are given of the extent to which government policy at local or national level was affected by the consultation.

4.44 Experience of campaigns is limited to two countries. Undoubtedly in Tanzania where they have been most extensively used they have been helped by the political structure which Tanzania has created for communication throughout the country and for adult education. But we can sum up with four conclusions which would apply more generally:

> The campaign method enables educators to reach extremely large audiences although, to do this, it is necessary to set up a large organisation to service groups and train group leaders. This imposes major burdens on the agencies responsible.
>
> Campaigns have some success in reaching the poorest members of society and in reaching non-literate students.
>
> Campaigns appear to have a successful record both in enabling people to learn from the radio, from print and from group discussion and in

stimulating activity on the part of participants.

As it is of the essence of such campaigns that they run for a short time, there are severe limits to the educational content of a radio learning group campaign. Even the successive campaigns in Tanzania did not add up to a curriculum comparable to that of the Latin American radiophonic schools.

4.45 Other groups. Although most of the experience of linking mass media with group study has come from radio schools, farm forums or radio campaigns, a number of organisations have used group study in other ways and used mass media to support the work of existing groups. In Lesotho, for example, the Lesotho Distance Teaching Centre has used radio and print to help existing groups to learn. In Botswana, the Botswana Extension College provided radio and print support to the work of Village Development Committees, and of agricultural youth clubs (4B clubs). There is also well documented experience from Tanzania of using mass media to support co-operative education at the Co-operative Education Centre.

4.46 Such projects have more modest aims than those of radio schools, for example. They are usually using mass media to teach a narrower range of skills and there is little evidence which compares their effects with the effects of alternative approaches. Studies in Botswana suggested that the techniques were of value for teaching about village development and for teaching young people about growing fruit trees. There was a higher survival rate for fruit trees planted following a print and radio educational programme than there had been in a previous scheme without that support (BEC Evaluation Unit 1975). Some radio schools, too, have run agricultural courses with more modest aims than their programmes of basic education. In Chile, for example, radio school methods were used to teach about horticulture, about goose keeping, and about rabbits. Participants introduced the recommended methods horticulture and goose keeping but not of rabbit keeping, where they could not afford the breeding pairs. (Amtmann et.al 1977).

4.47 In Lesotho, one meticulously researched experiment compared the use of printed matter by groups with its use by individuals. Lesotho Distance Teaching Centre prepared pamphlets on how to crochet and made these available both to individuals and through existing women's organisations. Group leaders were given a limited amount of training in how to use the booklets and how to conduct their groups. Under these conditions, where groups used the booklet as recommended, 85% of group members performed an end of course test correctly; 96% of beginners learned to crochet. Four times as many group members were successful in learning to crochet as compared with private individuals who received the booklet. (LDTC 1978, pp.36-42).

4.48 The Co-operative Education Centre (CEC) in Tanzania has used group study, supported by radio and correspondence courses, for co-operative education. Between 1965 and 1970 CEC used these methods to teach about 15% of all co-operative committee members. Many of these were illiterate so that it was only through the group method - with at least one literate member in each group - that they could follow the course. During the period 22% of group members completed this course and received their certificate, compared with 28% of individual - and necessarily literate - students. The ultimate completion rate was expected to be higher (Grabe 1975, p.603).

4.49 Limited though it is, there is, then, some evidence for the effectiveness of this mode of group study. It has one important limit: it reaches those students who are members, or potential members, of the organisations on which it is based and its reach into the community is likely to be no longer than theirs.

4.50 There are theoretical grounds for believing that group learning, linked with mass media, should be effective. It allows personal encouragement and discussion to support the suggestions made by specialists in print or by broadcast. And it allows learners to discuss ways in which the, necessarily general, information from these media can be applied in their own community. Practice tends to confirm the theory and we can conclude, on groups generally, that they do provide a mechanism for large numbers of people to learn both educational material in general and agriculture in particular. The wide variation in styles of group learning between different countries, and different continents, make it more difficult to generalise about the best pattern of organisation for a particular country or a particular educational problem. Where such an organisation exists, group study makes possible communication from learners to educational or agricultural establishments. But their success depends on the existence of an effective supporting organisation on the ground, as well as the production of effective teaching materials.

B. <u>Mass media for individuals with feedback</u>

4.51 Mass media are often used as one-way channels of communication. Usually, there is no ready channel for a newspaper or a radio station, for example, to receive regular feedback from listeners or readers. Of course both inevitably receive some feedback: producers travel the countryside seeking reactions to their programmes, newspapers get letters from their readers, figures of listenership or sales provide some information to managers. It is useful, however, to distinguish between that kind of feedback and attempts to provide it in regular and systematic ways. A number of broadcasting

Table 13: Cost of correspondence education through INADES-formation

Currency: 1978/79 US $$ a/

	Cameroon	Rwanda
Fixed costs	72 791	85 439
Variable costs	64 222	22 565
Total	137 013	108 004
No. of students	573	1 010
Cost per student b/	239	107

Source: Jenkins and Perraton 1981

Notes:

a. Although these figures are from 1978/79 accounts we have not deflated them and assume they are reasonably accurate for 1978. A 7.5% discount rate is used.

b. The cost to INADES-formation is reduced by some $15 because of fees paid by students.

5.23 To the costs of correspondence teaching one may add the cost of attending face-to-face sessions: the cost per person/day in Cameroon was $58.85. If we assume that each student should attend two such sessions each year, then we get annual costs of $357 in Cameroon and, assuming comparable face-to-face costs there, of $225 in Rwanda. We can calculate the cost functions for studying by correspondence in both cases:

TC = AC(N) + F

$137 013 = 112.08 (573) + 72 791 (Cameroon)

$108 004 = 22.34 (1010) + 85 439 (Rwanda)

Thus, while the fixed costs for Cameroon and Rwanda are very similar, there are striking differences in the variable costs. The figures also suggest that there may be potential economies if INADES-formation could increase its enrolment substantially. At present INADES-formation clearly does not expect to enrol students on the scale of the Latin American radio schools, although their experience suggests that such an expansion might perhaps be possible.

5.24 In contrast with INADES-formation's concentration on print, RER was essentially a radio project but with extensive staff time and travel used for collecting feedback. The costs of this are reflected in their production costs. The costs of production, transmission and reception for 1968-71 were calculated by Trabelsi (1972) and Table 14, for 1970, is based on his work. The cost includes estimates for the amortisation of capital.

Table 14: Costs of RER Senegal, 1970

Currency a/	CFA	1978 US $
Transmission cost per hour b/	5 900	39
Production cost per hour	355 200	2 326
Total	361 100	2 365
Cost per listener per hour c/	0.451	0.0030
Reception cost per listener per hour	0.018	0.0001

Source: Trabelsi 1972

Notes:

a. Taking 250 CFA = $1.00 and US deflator of 1.637

b. For 46 hours of broadcasts

c. Assuming an audience of 800 000.

C. Radio and Print

5.25 Where radio is used for education, its costs are of three kinds: for production, for transmission, and for reception. We have more estimates of the costs of production and transmission than of reception. And, where listeners already own radios, it is reasonable to include only the marginal cost of listening to educational broadcasts - often a figure so low that it will make little difference to calculations or to decision-making. Nevertheless, the figures for transmission and production vary widely. Table 15 sets out some recent costs which are probably comparable and in which some attempt has been made to include capital as well as recurrent costs.

Table 15: Estimated costs per hour of open broadcast

Country	Date of information	Costs per hour: Production Current US $	Production Constant 1978 US $	Transmission Current US $	Transmission Constant 1978 US $	Production and Transmission Current US $	Production and Transmission Constant 1978 US $
Tanzania a/	1979	464	408	124	109	588	517
Nepal b/	1975	82	99	53	64	135	163
Mexico b/	1972	115	179	14	22	129	201
Shetland Isles (Britain) c/	1978	n/a	n/a	n/a	n/a	427	427
Malawi d/	1980	n/a	n/a	n/a	n/a	1037	830

Notes:

a. Mbunda and Edington (1979) using a 5% discount rate and taking 8.074/- = $1.00

b. Unesco (1977) using a 7.5% discount rate

c. Postgate et al. (1979)

d.

5.26 Two recent studies enable us to look in more detail at the costs of broadcasts for farmers. Mbunda and Edington (1979) looked at the costs of school broadcasting but considered also the costs of broadcasting to farmers. Perraton, Jamison and Orivel (1978) looked at the cost of farm broadcasting in Malawi. We summarise their findings in Table 16. As, with open broadcasting, we can never be sure how large the audience is, figures for costs per listener are necessarily uncertain. But these figures suggest that, at least in East and Central Africa, production and transmission costs are likely to be in the range of $500 and $1 000 per hour and annual costs per listener between $0.10 and $0.75.

Table 16: Costs of radio broadcasts in Malawi and Tanzania

Currency: 1978 US $$

	Malawi a/	Tanzania b/
Transmission cost per hour	806 c/	113 d/
Production cost per hour	111	428
Total cost per hour	917	541
Cost per listener per hour e/	0.0031	0.0005
Cost per listener per year f/	0.740	0.1353
Reception cost per listener per year g/	n/a	2.0709

Notes:

a. Taking $1.20 = K1.00 and a deflator of 0.8 to convert from 1980 Malawi Kwacha to 1978 $$, and using a 7.5% discount rate.

b. Taking 8.074/- = $1.00 and a deflator of 0.88 to convert from 1979 Tanzania shillings to 1978 $$. Mbunda and Edington use 5% and 10% discount rates: for the sake of comparability we have taken the mid-point between their 5% and 10% figures as giving a good enough approximation for a 7.5% rate.

c. The actual discount rate used for calculating this figure is not available.

d. These are actual costs; if the radio transmitter network were extended to cover the whole country, the cost might rise as much as three times.

e. Assuming audiences of 300 000 in Malawi and 1 000 000 in Tanzania.

f. For 232 hours of farm broadcasting ayear in Malawi and 250 in Tanzania.

g. Assuming a 5-year life for a set and 10 listeners per set.

5.27 Where production costs are high, the costs of broadcasting can, of course, be much higher than this. Even excluding capital costs, the Manoff advertising campaigns appear to have cost $1.75 to $2.50 to reach each family in their target audience. (1978 $2.03 - 2.90) (Manoff 1977).

5.28 Costs for television have not been calculated but such figures as are available suggest that these would be between ten and thirty times as high as for radio. Furthermore, television presents major problems of reception and maintenance, especially in the poorest and most remote areas. There is little experience of television for basic education or agricultural extension in developing countries where factors are favourable to its use - such as a compact agricultural area, with common linguistic and agricultural features, a high proportion of villages with mains electricity, and a television service already developed for non-educational purposes.

5.29 We have some information on the costs of producing educational magazines or papers, though none on the cost of village newspapers. As we saw above, (para. 5.7) with a print run of 70 000 the sixteen-page el campesino costs $0.21 per copy. In Malawi we found that the bi-monthly Za achikumbi, also of 16 pages and with a circulation to farmers of 30 000, costs K1.86 to K2.13 per farmer per year. This gives a cost per issue of US $0.30 - 0.34 per copy. With a print run of only some 15 000, the Lesotho pamphlet on crocheting cost $0.70 per recipient, but some 26% of this cost was for distributing the pamphlet, a figure omitted from the costs for el campesino and Za achikumbi. Where, as with the radio campaigns, print has been used to support broadcasts, the costs are often not disaggregated.

D. Cost summary

5.30 The information on costs is summarised in Table 17. It is limited, and provokes difficult questions about the legitimacy of comparing costs across national and cultural frontiers. For some types of project, we are extremely short of even the sketchiest information: we have for example, very little information on the costs of radio farm forums, despite their existence in more than a dozen different countries.

5.31 The costs in Table 17 need to be seen, too, against the information available about the costs of radio broadcasting and the costs of print. The hourly cost of radio per listener, in particular, is so low that much of the expenditure on multi-media projects must be on elements other than radio. A high proportion of the costs appear to reflect administration, the development of teaching material, and the support of group learning.

5.32 Some further generalisations are possible.

5.33 The large-scale Tanzanian campaigns appear to have achieved costs which are very low as compared with other forms of multi-media education, or, indeed, with any other form of education. Assuming the figures are reasonably accurate, these low costs are explained by four factors:

the campaigns were big enough to achieve major economies of scale;

they made extensive use of unpaid group leaders;

printed materials were supplied on a group basis and not to every individual;

government and party staff devoted time to setting up and supporting groups, as part of their regular duties, and the value of this time is not adequately reflected in the costs.

Samller campaigns, with participants measured in tens of thousands rather than millions, achieved costs between two and ten times as high as large campaigns. Judging by the single example of the costs of farm forums, their costs, for an intensive campaign reaching a larger number of people, are comparable to those of a radio farm forum, reaching a smaller number but over a much longer period.

5.34 We are on surer ground with radio schools. Here, despite the range of students from 14 500 to 170 000, annual costs per student are within the range of $29 to $64. As their work in basic education can be compared with primary schooling, it is also possible to show that costs per student, and costs per student promoted, are lower for radio schools than for orthodox education. The scale at which the radio schools operate, their use of volunteer group leaders, their support from the church, and their extensive use of radio all help to produce these results.

5.35 The evidence from Lesotho shows that, where an organisation is running a number of different teaching activities, unit costs can be kept down for more modest projects, as with the crochet course. But attempts to teach a whole curriculum - as with INADES-formation or the radio schools - do demand a body of students probably in the tens of thousands rather than the thousands. The fixed costs, in Rwanda and Cameroon alike, are high in relation to the number of students, when compared with those for other multi-media projects, while the variable costs in Cameroon are also high. Multi-media teaching can reduce educational costs but it is not necessarily a recipe for doing so.

5.36 If we compare the costs for multi-media projects with those for orthodox literacy work, discussed in section III, two conclusions follow. First, it is possible to teach people either a broad curriculum, as with the radio schools, or narrower skills, as in Lesotho, at costs well below those often achieved for literacy projects. But, second, the extremely large literacy campaigns show economies of scale which appear otherwise only to have been achieved by the Tanzanian radio campaigns, themselves also on a very large scale.

TABLE 17: Costs and cost functions of multi-media projects

Project	Units for measuring N	N at time of study	Cost function in 1978 $	Average cost for given N in 1978 $	Evidence on effects	Evidence on comparable costs
Radio schools						
ACPO	students p.a	170 000	TC(N) = 15.94(170000) + 2 247 770 a/	29.16	35% success in literacy; some evidence of changes in attitudes and practices in health and agriculture	n/a
RSM	students p.a	20 000	TC(N) = 18.78(20000) + 342 18[illegible] b/	35.88	60% of students promoted annually; 57% of students are women; moderate success in reaching poorest.	Cost per student lower than cost in conventional classes
ECCA	students p.a	14 623	n/a	64	72-75% of students promoted annually	Cost per student lower than cost in conventional class
Farm Forums						
India	Members p.a.	? -20000	n/a	8.30-18.80	Some evidence of learning. Government not clearly convinced of value of forums.	n/a
Radio campaigns						
Our land Botswana	Participants in campaign	55 300	TC(N) = 6.13(55300) + 149 451 c/	8.84	Women less well represented than men in audience. 40% participants with no cattle.	n/a
Tanzanian large campaigns	Participants in campaign	2 - 2.5 m	n/a	1.30-4.30	Changes in health practices. Evidence of learning.	Costs of projects undertaken by peasants lower than current market rate

'A time to rejoice' Tanzania	Participants in campaign	20 000	n/a	3.20	n/a	n/a
'Learning about government' Botswana	Participants in campaign	3 500	n/a	14.27	Some knowledge gains	
Other groups						
Crochet project - Lesotho	Participants in campaign	10 800 individuals + 1 500 group members	TC(N) = 0.15(10800) + 240 (1500) + 6044 d/	0.70 (individual) 2.32 (group members)	47% of individuals and 96% of group members learned to crochet	Teaching groups may be more cost-effective than teaching individuals.
Courses for individuals						
INADES-formation Cameroon	Students p.a	573	TC(N) = 112.08(573) + 72 791 e/	239.12	Subjective evidence of courses' effectiveness	High variable cost; high fixed cost in relation to number of students
INADES-formation Rwanda	Students p.a	1 010	TC(N) = 22.34(1010) + 85 439 e/	106.93	n/a	n/a

Source : text

Notes:

a. Using a 10% discount rate

b. Including an estimated figure for capital

c. Omitting capital

d. Omitting capital

e. Using a 7.5% discount rate

VI CONCLUSIONS

A. Implications for policy

6.1 We look in turn at the general conclusions from this study, at its implications for basic education, for agricultural extension, and for costs.

6.2 General. Mass media have proved an effective way of teaching people who meet together in groups, in order to study material taught through broadcasts and print. The combination of mass media and group learning has been used for teaching the content of basic education, for teaching certain techniques, and for stimulating action within a community. The success of such methods depends on the existence of an organisation to support and encourage learning groups.

6.3 Either radio or printed materials can be effective in communicating information to individual learners, who are not organised into groups. It is reasonable to assume that they are less effective used in this way, but they are also much cheaper. Radio is a particularly cheap medium, in terms of cost per listener, in a number of developing countries, provided that the audience is large enough for the production and transmission costs to be spread widely. We know little about the limits to the effectiveness of mass media used in this way.

6.4 Under the right circumstances, mass media used with or without a group organisation, can reach a large proportion of adult populations, and can reach both women and other disadvantaged groups. Group organisations have, in Latin America, reached between 1% and 5% of rural adult populations each year. Radio broadcasts, even in countries where radio ownership is not yet universal, can reach 30% or more of target, rural, audiences.

6.5 Correspondence education, has provide an effective method of teaching both basic and specialised subject matter. It can be assumed that it is more effective when linked with radio. The major problems which arise, as with other forms of part-time education for adults, concern retention and dropout rates.

6.6 Basic education. Mass media have proved more successful at levels above the most basic, less successful at teaching literacy or numeracy, even with some face-to-face support, to adults who have never been at school. (In this regard they are probably comparable to orthodox forms of education.) The radio schools of Latin America, for example, have had more success at such levels.

6.7 Of the separate components of basic education, mass media have been successful in developing skills in literacy and numeracy, in enabling people to benefit from change, and in increasing their efficiency in acquiring information. There is insuffucient evidence to show how far they achieve broader goals.

6.8 Many mass media programmes have had relatively narrow aims, of teaching particular skills or methods, or about particular aspects of agriculture or health. A smaller number, mainly in Latin America, have attempted to go beyond this and teach a curriculum of basic education. We can infer, from both sets of experience, that as the methods can be effective for narrow objectives, so there is no reason to suppose they will not be effective for broader ones. What is lacking - for the radio campaigns of Tanzania for example - is the idea of a curriculum, or the intention to relate together different elements of adult education so that the whole is greater than the sum of its parts.

6.9 Agricultural extension. Mass media, and especially radio, have demonstrated in a wide variety of countries, their ability to carry information to farmers about agriculture. Radio is often seen, by farmers, as an important source of agricultural information. It is also a very cheap way of communicating with farmers. Correspondence courses can teach farmers and it appears that farmers can introduce changes into their practice as a result of following such courses. Mobile cinema vans in at least two African countries appear to be successful in providing information to farmers. Where distance teaching techniques have been used, feedback from farmers to extension or education agencies is possible.

6.10 There is an unrealised potential in using mass media to support agricultural extension agents, and to train them in-service. Oddly, while this use of radio and print is so widespread for upgrading primary school teachers as to be almost the norm in many developing countries in Africa, it has been little used to upgrade extension agents. The experience of INADES-formation suggests that this may be an important future role for the mass media.

6.11 Generally, the evidence about the effectiveness, and about the costs, of using mass media for communicating agricultural information is such that its increased use may be of major importance as extension grapples with the problems of budget limits and of scaling up its level of activity.

6.12 Costs. The use of mass media, unsupported by a group activity in the field, is very cheap, especially when compared with the costs of face-to-face contact. Comparisons of effectiveness are more difficult. Existing data does not permit us to make a comparison between the effectiveness of, say, listening to a radio programme for an hour and talking with an extension agent for an hour. But evidence from Malawi suggests that the costs are in the ratio of 3000:1. Thus the cost for each contact between an agricultural extension agent and a farmer was between (1978) $15 and $21; in contrast the cost per farmer of attending a puppet play was about $0.08, of watching an

agricultural film for an hour was $0.17, and of listening to an hour's agricultural radio programmes was $0.004. Costs obviously vary from place to place, but it seems likely that they are often of this order of modesty. Similarly, where the scale is large enough, printed materials can be very cheap: the 16-page Colombian magazine el campesino costs only $0.21.

6.13 The costs of teaching individuals with correspondence courses, either with or without radio support, depend so much on the numbers involved and the overall costs of the agencies running those courses, that few generalisations are possible. There are circumstances under which such teaching can be cheaper than alternatives. If it increases the effectiveness of, say, extension agents, the potential benefits may be very large indeed.

6.14 Where a group organisation exists to support learners, costs are, of course, much higher than they are for mass media alone. Radio campaigns, reaching audiences of about 2 million, for a period of two to three months, probably had costs of between $1 and $5 per participant. Radio schools in Latin America, with audiences of between 20 000 and 200 000, can teach the equivalent of a primary school curriculum for between $30 and $65 a year. (In both cases the opportunity costs of the participants' time is not included.) While these audiences are far smaller than those for the Tanzanian campaigns, they are nevertheless significant. If a radio school, or something like it, recruits 2½% of the rural adult population in a year, then, over twenty years it may have taught a quarter or a third of all the adults in a country. The costs for such an achievement can be modest. If the annual cost is of the order of $50 per participant, then one could reach 1¼% of the population each year for $0.625 per head of the population. Expressed as a percentage of GNP per head, this would mean the devotion of the following resources:

GNP of $180 (e.g. India)	0.35%
$400 (e.g. Ghana)	0.16%
$600 (e.g. Papua New Guinea)	0.10%

6.15 The case for educating adults cannot rest on that sort of arithmetic, involving, as it does, huge assumptions and uncertainties. But the evidence suggests that a case can sometimes be made for investment in well-designed multi-media educational projects for adults.

B. Implications for research

6.16 In assessing the value of mass media, we are hampered by the shortage of comparable data on the effectiveness of orthodox methods of education and especially extnesion. Despite the level of government, and international, investment in agricultural extension services, there is little data which

shows how valuable extension services are in raising productivity. Along with further research and experiment on the use of mass media, which is discussed below, we therefore need more on orthodox extension, and its costs and effects.

6.17 Considerable further research is needed about the ways in which mass media, and especially radio, can best support the work of agricultural extension. The need is not for further general surveys, but for case studies and field experiments. One part of this work should be a study of farm forums, which have existed for over 40 years, despite wide scepticism about their value, and of which there is apparently only a single cost study.

6.18 There is scope for a guide to practice in the use of mass media for rural education. Existing documents, such as The educational use of mass media (World Bank Staff Working Paper No. 491), do not meet this demand.

6.19 This paper has concentrated on basic education and agriculture. There is considerable, but scattered, third world experience on the use of similar methods for health, nutrition and family planning and a similar survey could usefully be undertaken.

6.20 If basic education for adults is to be effective, it needs a curriculum, based on their interests and experience, rather than being a shadow of children's primary school curriculum. Further research is needed on the ways of devising and implementing such a curriculum.

APPENDIX A : MASS MEDIA PROJECTS

A1 The literature on mass media projects varies in the detail with which it describes them. In this Appendix we report evidence which is important for the argument of the paper but at too great a level of detail to be included in its main body.

A. Radio school students

A2 The literature on radio schools provides us with some detailed information about their students. Accounts of the work of ACPO in Colombia, ACPH in Honduras and Radio Santa Maria in the Dominican Republic show the number of students over a period of years, as in table A1.

Table A1: Student enrolments at 3 radiophonic schools

Year	ACPO Colombia	ACPH Honduras	RSM Dominican Republic
1948	45 a/	not yet established	not yet established
1949	1 339	" " "	" " "
1950	3 636	" " "	" " "
1951	5 436	" " "	" " "
1952	10 848	" " "	" " "
1953	15 648	" " "	" " "
1954	20 409	" " "	" " "
1955	82 319	" " "	" " "
1956	109 989	" " "	" " "
1957	136 385	" " "	" " "
1958	145 248	" " "	" " "
1959	112 576	" " "	" " "
1960	114 186	" " "	" " "
1961	129 681	306 d/	" " "
1962	215 309	7 520	" " "
1963	n/a	11 298	
1964	n/a	14 624	n/a
1965	n/a	8 261	n/a
1966	n/a	9 745	n/a
1967	n/a	11 548	n/a
1968	n/a	16 564	n/a
1969	n/a	13 595	n/a
1970	n/a	14 254	n/a
1971	169 696 b/	n/a	12 238 e/
1972	n/a	n/a	22 375
1973	167 451 c/	n/a	20 171

Notes:

a. ACPO figures for 1948-62 are from Primrose (1965) p.159

b. Brumberg (1975) p.8

c. McAnany (1975) p.242

d. ACPH figures are from White (1976a) p.38

e. RSM figures are from White (1976b) pp.52-3

A3 Information from the Dominican Republic and from Bolivia gives us more detail about the students of Radio Santa Maria and of ERBOL. For RSM, White looked at the amount of land owned by the fathers of RSM students, and then compared this with the amount held in farm units in the region generally, with the results shown in table A2. This showed that RSM reached some of the poorer families but also enabled him to reach the conclusion reported that RSM students 'have a somewhat higher socio-economic status within rural communities (though not within the larger national social status system)' (White 1976a, p.25).

Table A2: Land ownership and RSM students

	RSM student %	Regional figures for farm units
Father owns no land	21.6	
Father owns land	78.4	
	100	
Amount held		
less than 0.5 hectares	22.2	20.0
0.5 - 4.9 hectares	40.7	56.1
more than 5 hectares	37.1	23.9
	100	100

Source : White 1976a, pp.18-25

A4 From Bolivia comes evidence, referred to in the text, showing that radio schools can reach the poorer members of communities, such as the non-Spanish speakers. Table A3 shows some details of two groups of ERBOL students in 1976.

Table A3: Characteristics of ERBOL students, 1976

	Literacy students %	2nd and 3rd year students %
Sex		
Male	42.0	48.6
Female	58.0	51.4
Occupation		
Farmer	35.8	42.6
Housewife	45.7	39.8
Shopkeeper or trader	7.0	5.6
Other or not stated	11.5	12.0
Language		
Spanish	33.7	35.6
Quechua	32.9	47.7
Aymara	30.5	15.7
Other or not stated	2.9	1.0

Source : ERBOL - ACLO 1977

B. Effects of farm forums

A5 There is little firm, researched, evidence on the effects of radio farm forums. The single study on forums in Ghana is therefore important, particularly as it compared villages with forums with others supplied just with a radio and others with neither forum nor radio. The results of a study, completed after the farm forum had been operating for five months, which show differences between the forum villages and the controls, are set out in Table A4. These suggest the effectiveness of forums although the report did not test the results for their statistical significance.

Table A4: Effects of radio farm forums in Ghana

Measure	Percentage of respondence reporting positively			
	Villages with 1 forum (no=89)	Villages with 2 forums (no=82)	Villages with no forum but with radio supplied (n=84)	Villages with no forum and no radio supplied (no=83)
Evidence of activity				
Action reported to increase agricultural productivity	60	53	42	35
Measures taken to improve marketing	25	23	21	9
Action or plans to improve harvesting and processing crops	27	24	8	13
Joined a co-operative	16	19	5	6
Evidence of knowledge or attitude a/				
Knowledge of government policy on import controls	25	30	14	6
Knowledge of government loan schemes	40	33	31	28
Favouring school support for preservation of Ghanaian culture	21	22	12	10
Supporting government policy on self-help projects	81	78	81	62
Use of protein in babies' diets	51	46	41	36
Claim to be saving for emergencies	70	60	57	50
Belief in joint husband-wife decision making	55	56	51	47
Attitudes to citizenship	no significant difference a/			

Source : Abell (1968) pp.36-40

Note:

a. Certain questions on attitude to government omitted because of difficulty in interpretting them.

C. Effects of radio campaigns

A6 The Tanzanian campaign 'Man is health' (Mtu ni afya) was evaluated with an assessment of its effect on participants' health practices. Hall investigated changes in health practices, and the building of latrines, which could be attributed to the campaign, in a sample eight villages, with the results set out in tables A5 and A6.

Table A5: Changes in health practices in sample eight villages - Tanzania 1973

Health practice	Number of houses, pre-campaign	Number of houses, post campaign	Percentage change
1. Elimination of vegetation growing near house	286	1 916	+570
2. Elimination of stagnant water near house	357	548	+ 54
3. Mosquito netting in bedroom(s)	136	147	+ 8
4. Mosquito netting on windows	84	111	+ 32
5. Latrine meeting Mtu ni Afya standard	494	335	- 32*
6. Cover on latrine	328	685	+109
7. Latrine in use	421	939	+123
8. Elimination of rubbish around house	421	1 248	+182
9. Elimination of animal feces near house	1 399	1 223	- 13
10. Absence of rats or other vermin in or around house	503	773	+ 46
11. Windows in house	245	375	+ 53
12. Absence of "a lot" of flies in and around house	818	1 572	+ 92

* Because the criteria for latrines were relaxed at the time of the post-survey, some latrines counted in the pre-survey were, apparently, later not thought to be of standard quality.

Source : Hall (1978), p.58

Table A6: Latrines built or rebuilt in sample eight villages during campaign - Tanzania 1973

Region	Number of houses	Number of new or rebuilt latrines	Percentage of houses with new or rebuilt latrines*
Dodoma	1 720	558	32
Coast	364	143	39
Total	2 084	701	34

* Only latrines that met campaign standards were counted.

Source : Hall (1978), p.59

D. The cost of radio schools

A7 The fullest accounts of the cost of radio schools are for ACPO. Brumberg (1975) and Tuckman and Nias (1980) provide figures from which it is possible to calculate costs, including costs for capital, and produce a cost function for ACPO. Brumberg showed that the running costs for ACPO were as in Table A7.

Table A7: ACPO costs

	million pesos 1972	constant (thousands) 1978 $$ a/
radio production	12	948
cultural/teaching	14	1 106
printing and publishing	20	1 580
newspaper	7	553
regional activities	15	1 185
administration and other charges	18	1 422
	86	6 794

Source: Brumberg (1975) p.51

Note:

a. We have multiplied the 1978 figure by 1.58 and divided by 20 for this conversaion.

A8 His figures do not include an estimate for the cost of buildings and equipment, but Tuckman and Nias (1980), p.159 suggested that, at a 10% discount rate, the annualised cost in 1976 was $1 307 067. We can assume that the costs of buildings and equipment in 1972 were of the same order of magnitude in 1976 as in 1972. Inflating the 1976 figure by 1.16 we therefore have, in 1978 $$:

	'000 $$
Running costs	6 794
Capital costs a/	1 516.2
	9 310.2

A9 Brumberg found that 61% of ACPO's expenditure was on education, as opposed to their commercial activity, so that their total expenditure on education was (61/100 x 9 310) or $5 679 200.

A10 We can also distinguish between expenditure on ACPO's newspaper el campesino and on its teaching activities. El campesino cost 8.1% of the total running costs. Assuming that 8.1% of the capital costs can properly be attributed to it, we get the following allocation:

	1978 $$
Cost of el campesino (8.1/100 x 9 310 200)	754 130
Other educational costs	4 925 070
Total educational expenditure	5 679 200

A11 At the time of his study, Brumberg found ACPO was teaching some 170 000 students a year so that the basic annual cost per student in 1978 $$ was

$$\frac{4\ 925\ 070}{170\ 000} \text{ or } \$28.97.$$

El campesino had a press run of 70 000 a week so that the cost per copy was

$$\frac{754\ 130}{70\ 000 \times 52} \text{ or } \$0.21.$$

A12 Students on ACPO's complementary course (25 500 students) used a monthly supplement of el campesino as their basic text; this amounts to 8 pp, and el campesino is normally 16 pp in length. We should therefore add to the cost of teaching students the value of (12 x 25 500 x ½) copies of the newspaper or $32 130 which would raise the average cost per student to

$$\frac{4\ 925\ 070}{170\ 000} \text{ or } \$29.16.$$

A13 We can therefore calculate the following cost function for ACPO. The total cost for ACPO's students is:

4 925 070 + 32 130 or $4 957 200.

We can regard as fixed the costs of capital, radio production and administration. Taking into account the allocation of 39% of costs to ACPO's non-educational activities and a further 8.1% to publishing el campesino we therefore have as fixed costs:

52.9% of capital costs	902 070
61% of radio production	578 280
61% administration etc.	867 420
	$2 247 770

This gives us a variable cost of $2 709 430

and a cost function TC = AC(N) + F

$4 957 200 = 15.94 (170 000) + 2 247 770.

A14 White (1976a) gave some comparable figures for RSM, including details of the budget for 1975, which are set out in table A8.

Table A8: RSM costs

	1975 $	1978 $
Central administration, teaching and records	95 550	117 527
Depreciation	7 500	9 225
Building, lights, telephone	8 400	10 332
Broadcasting	64 700	79 581
Preparation of masters for printing	4 800	5 904
Printing - supplies and distribution	73 100	89 913
Field teachers and supervisors	183 600	225 828
Public relations	25 000	30 750
Office costs	23 600	29 028
	486 250	598 088

Source: R White (1976a) table 9.2

If we regard the first five items in table A8 as fixed and add to them a notional 20% to allow for capital costs we get, in 1978 $$:

Fixed costs : capital (20% of 598 088)	119 618
recurrent	222 569
	$342 187
Variable costs:	375 519

The cost function is then:

TC = AC(N) + F

$717 706 = 18.78 (20 000) + 342 187

A15 White went on to compare RSM costs with those for conventional classes. He looked at the costs both for the 20 000 students which RSM had and for a projected 40 000. Figures for conventional classes were available only for 40 000 students. The comparison is shown in table A9.

Table A9: RSM cost comparisons

	Enrolment			
	20 000		40 000	
	1975 $$	1978 $$	1975 $$	1978 $$
Cost per student enrolled				
conventional classes	n/a		38.91	47.86
RSM	24.31	29.90	19.96	24.55
Cost per student promoted				
conventional classes	n/a		62.44	76.80
RSM	40.52	49.84	33.27	40.92

Source: R White (1976a) Table 9.2

E. The cost of radio campaigns

A16 The extent of the difference between reports of the radio campaigns Tanzania and Botswana makes it necessary to discuss their costs in more detail. As we saw, reports, which include some cost information, have been published for five campaigns. Hall and Dodds (1974) produced an account of Tanzania's campaigns up to 1973 and included costs of 'A time to rejoice'. Hall (1978) then produced a separate study of the 1973 health campaign 'Man is health' with figures for the externally financed costs of that campaign which claimed an audience of two million. Meanwhile Grenholm (1975) had described the same campaigns and published the budget for the next campaign, run in 1975, 'Food is life' on nutrition and food production. So we have figures for three Tanzanian campaigns, two large and one small. They have in common that they include direct but not indirect costs, omitting, for example, the cost of staff time.

A17 The 1976 Botswana campaign on land policy 'Our land' was described in detail by Ministry of Local Government and Lands (1977). Unusually the report describes costs in detail, and separates direct from indirect costs. This information is amplified in a technical note by the Evaluation Unit, Botswana Extension College (1977). Costs for the 1977 regional campaign of political education, 'Learning about government' organised in the western Kalahari were included in the report by Boipelego Education Project (n.d.? 1980).

A18 The fullest analysis of costs appears in the account of 'Our land'. MLGL (1977) para 5.31 says in presenting the costs:

> 'The total cost of the campaign between 1st November 1975 and 31st March 1977 is estimated at P416 000 (US $483 000). This can be divided into direct and indirect costs. Direct costs are costs which arose expressly because of the campaign and would not otherwise have occurred. Indirect costs include the costs of Botswana's resources which were diverted from other activities to the campaign. An RLG leader training course, for example, would have the direct costs of food, accommodation and transport for the leaders, and the indirect costs of extension workers' time spent organising and running the course.'

Etherington expands on this (Evaluation Unit, BEC 1977, p.2) to point out that:

'
- no estimation of rent or its opportunity cost (what a government department's buildings could be leased for) are included
- no allowance is made for the tax paid on salaries (and the net cost to Government of its officers working on the campaign is their income after tax)
- the costs cover only the seventeen month period between 1 November 1975 and 31 March 1977; thus they exclude, for example, the tour by HE the President and the Cabinet before the RLG campaign and the recent report writing period

- the opportunity costs of the time the estimated 3 200 RLG leaders and 52 100 RLG members spent in attending meetings for 532 900 per hours are also excluded.'

They also exclude the supplementation and gratuity for expatriate staff working on the campaign, so that the staff costs are those that would have been met had the campaign staff been entirely localised - as, in the future, one might expect them to be.

A19 With those exceptions, we have clear and detailed figures for the costs of the campaign, as shown in Table A10. The direct costs proved to be only 38.6% of the total. The figures enable us to produce a cost function for this campaign. If we regard as fixed the items for co-ordination, evaluation, senior staff support and overheads to senior staff we get a total fixed cost of P110 800. Omitting the cost of radios, for reasons discussed in the next paragraph, we then have variable costs of P251 500. (The costs of 1978 $$ are $149 451 and $339 233 respectively.) With 55 300 participants in the campaign, we then have a cost function:

$$TC = AC(N) + F$$

$$\$488\ 684 = 6.13\ (55\ 300) + 149\ 451.$$

This function omits any allowance for capital costs.

Table A10: Direct and indirect costs of 'Our land' campaign

Direct costs	Pula	Percentage of total costs
Campaign coordination	9 000	2.2
Fieldwork and training	19 000	4.7
Teaching materials	45 500	10.9
Hardware (radio and tape recorders)	54 100	13.0
Consultation	17 300	4.2
Evaluation	8 800	2.1
Transport	5 000	1.2
Postage (official free)	1 200	0.3
Total direct costs	160 600	38.6
Indirect costs		
Field support (extension workers' time, etc.)	137 700	33.1
Senior staff support	41 600	10.0
Overheads to senior staff	51 400	12.3
Radio air-time	4 700	1.1
Transport	20 400	4.9
Total indirect costs	255 800	61.4
TOTAL CAMPAIGN COSTS	416 400	100.0

Source: MLGL (1977) para. 5.31

A20 If we want to compare these figures with those of any other campaign we are faced with three difficulties. First, in the absence of a similar breakdown between direct and indirect costs for any other campaign, we do not know how far the Botswana experience is typical. Second, the Botswana

TABLE A11: The costs of five campaigns

	1		2		3		4		5		6		7		8	
Title	A time to rejoice		Man is health		Food is life				Our land						Learning about government	
Country	Tanzania		Tanzania		Tanzania				Botswana						Botswana	
Date	1971		1973		1975(budget)				1976						1979	
Currency	000/-		000/-		000/-				P 000						P	
No. of people	20 000		2 m		2.5 m				55 300						3 500	
							Direct costs only		Total costs		Direct costs omitting equipment		Total costs omitting equipment			
		%		%		%		%		%		%		%		%
Coordination, planning, staff	-		-		-		9	5.6	102	24.5	9	8.5	102	28.2	-	
Fieldwork and training	13.5	16.5	463	23.9	1 138	24.5	19.7	12.2	157.4	37.8	19.7	18.5	157.4	43.4	5 204	37.6
Materials, radio, publicity	54.8	17.1	1204.5	62.1	3 150.8	67.8	45.5	28.2	50.2	12.0	45.5	42.7	50.2	13.9	5 211	37.7
Distribution, travel, transport	11.7	14.3	257.6	13.2	335 a/	7.2	5	3.1	25.4	6.1	5	4.7	25.4	7.0	535	3.9
Hardware	-		-		-		54.1	33.7	54.1	13.0	omitted		omitted		-	
Research, evaluation, follow-up	1.7	2.1	16.5	0.8	15	0.3	26.1	16.3	26.1	6.3	26.1	24.5	26.1	7.2	2 695	19.5
Other	-		-		8.8	0.2	1.2	0.7	1.2	0.3	1.2	1.1	1.2	0.3	182	1.3
TOTAL	81.7	100	1941.6	100	4 647.6	100	160.6	100	416.4	100	106.5	100	362.3	100	13827	100
Estimated cost in 1978 $$	19 224		405 180		810 857		216 623		561 656		143 651		488 683		14993	
Cost per participant in 1978 $$	0.96		0.20		0.32		3.92		10.60		2.60		8.84		4.28	

Note: Source : see text

a. Some transport costs are included in the figure for materials in this campaign.

costs include a figure of P54 100 for radios and cassette tape recorders which were supplied to group leaders or used for group training. This represented 13% of the total costs of the campaign. But other campaigns assumed that groups had access to a radio and did not provide them so that, to compare like with like, we need to omit the costs of the radios and tape recorders from the Botswana figures. The effect of this is to reduce the direct costs of the Botswana campaign to 29.4% of the total. Third, the costs are set out in slightly different forms for different campaigns: even where they are similar, we cannot assume that different researchers would put similar items under the same heading.

A21 But despite these reservations, there is enough similarity between the reports for us to be able to set out the figures, which appear in Table A11. Here we show, for 'Our land', both direct and indirect costs, and, in columns 6 and 7, examine the effect of omitting the expenditure on equipment. At the foot of the table, total costs and costs per participant have been converted into constant 1978 $$. It is reasonable to assume that, for all campaigns except 'Our land', the costs shown are just the direct costs and omit most, if not all, the indirect costs. In order to facilitate comparisons between campaigns, Table A12 shows the direct cost per participant in 1978 $$, omitting costs of equipment.

Table A12: Direct costs of campaigns per participant (omitting equipment)

Currency : 1978 US $$

	A time to rejoice	Man is health	Food is Life	Our Land	Learning about government
Coordination, planning staff	-	-	-	0.22	-
Fieldwork and training	0.16	0.05	0.08	0.48	1.61
Materials, radio, publicity	0.64	0.12	0.22	1.11	1.61
Distribution, travel, transport	0.14	0.03	0.02	0.12	0.17
Research, evaluation, follow-up	0.02	-	-	0.64	0.83
Other	-	-	-	0.03	0.06
TOTAL	0.96	0.20	0.32	2.60	4.28

Source : see text

A22 Three conclusions follow. First, the Botswana costs for research, evaluation and consultation are far higher than those for Tanzania. This fits with the descriptions of the campaigns whose aims included consulting the public about central and local government policy. Costs of this kind are incurred if there is a deliberate choice to spend money on such follow-up work.

A23 Second, if we assume from the Botswana experience that direct costs account for less than a third of the total cost of a campaign, then the five campaigns fall into two groups, with significant economies of scale in the large campaigns.

A24 But, third, we are unwise to take the figures at their face value. We know that some of the Tanzania figures are of externally financed costs only, and the contrast between the figures for different campaigns casts doubt on some of the very low estimates. If, however, we look at the costs for 'A time to rejoice' and 'Our land', both within the range of 20 000 to 55 000 participants, we find reasonable consistency. The figures suggest that, for a small campaign like this, one might expect the key costs per participant to fall in the range:

	$		
fieldwork and training	0.16	-	0.48
materials, radio, publicity	0.64	-	1.11
travel	0.12	-	0.14
	0.92	-	1.73

The costs for 'Learning about government' are higher than this, but one would expect this as that campaign had only 3 500 participants. (As some materials had to be prepared for fieldwork and training, one would expect economies of scale even under this heading as one moved from 3 500 to 20 000.) Thus, if we can assume that co-ordination is usually hidden among the indirect costs, we can suggest that the direct cost per participant of a small campaign is in the range of about $1.00 - 2.00. To this must be added a figure for any evaluation and follow-up. Assuming that the Botswana experience is typical, we need to multiply this by 3.33 in order to allow for indirect costs, giving a total cost per participant in the range of about $3.00 - 5.85.

A25 If these figures are right, then the figures for the large Tanzanian campaigns seem to under-report expenditure on fieldwork and training, and on travel, where one would expect few economies of scale in moving from an audience in the tens of thousands to one in millions. On the other hand, one would expect a reduction in the unit cost for teaching materials and radio, though even there the Tanzanian figures may be on the low side. To make a new estimate of the cost of a large campaign, we may therefore apply the figures from smaller campaigns for fieldwork and training and for travel, but take the figures for the larger campaigns for the cost of materials, radio and publicity - items that were externally financed for the large Tanzanian campaigns. If we do this, and allow for any under-reporting of the materials costs by multiplying these by a factor of 3 for our higher estimate, then we get the following range of costs for large campaigns:

	$		
fieldwork and training	0.16	-	0.48
materials, radio, publicity	0.12	-	0.66
travel	0.12	-	0.14
	0.40	-	1.28

Multiplying this by the same factor of 3.33 to allow for indirect costs we get a total cost per participant in the range of about $1.30 - 4.30.

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PART III

MASS MEDIA FOR AGRICULTURAL EXTENSION IN MALAWI

Hilary Perraton
Dean T. Jamison
Francois Orivel

Table of Contents

	page
Acknowledgements	149
Abbreviations	149
Currency	149
SUMMARY	150
BACKGROUND	151
AGRICULTURAL EXTENSION AND TRAINING IN MALAWI	151
Agricultural extension	151
Training Centres	155
EXTENSION AIDS BRANCH	156
Publications section	157
Technical section	159
Cine section	160
Radio section	160
Evaluation and action research unit	161
RELATIONSHIPS	162
CONSTRAINTS	162
RESULTS	164
Measures of output	164
The audience	166
Did they learn anything?	168
A COMPARISON WITH THE WORK OF EXTENSION OFFICERS	171
COSTS	173
The cost of radio	174
The cost of mobile units	174
The cost of print	177
The cost of evaluation and administration	178
Comparison with extension services	180
CONCLUSIONS	182
APPENDIX 1 : Main print jobs 1978	184
2 : Mobile vans schedule - northern region 1980	185
3 : Source of agricultural information for farmers	186
ANNEX A	187
ANNEX B	196
REFERENCES	200

ACKNOWLEDGEMENTS

This report is based on a visit to Malawi by Dean T. Jamison (World Bank) and Hilary Perraton (International Extension College) in May 1980. We are grateful to the staff of Extension Aids Branch, and of other parts of the Ministry of Agriculture, who were most generous of their time, their hospitality and their information. It is a pleasure to acknowledge their help here, and that of Unesco who funded Mr. Perraton's work on the study. The views expressed in the report are our own and not necessarily those of the World Bank or of the Malawi Ministry of Agriculture.

ABBREVIATIONS

ADMARC	Agricultural Development and Marketing Corporation
EAB	Extension Aids Branch
EAR	Evaluation and Action Research Unit
LADD	Lilongwe Agricultural Development Division
LLDP	Lilongwe Land Development Project
MBC	Malawi Broadcasting Corporation

CURRENCY

Currency Unit = Kwacha (K)

1980 US$1.23 = K1.00

SUMMARY

This paper reports the results of research concerning the role of mass media in providing information to Malawian farmers. To set the context, the paper begins with a brief description of the face-to-face information services provided by the agricultural extension system and by the farmer training centers; it then describes in more detail the operations of the Extension Aids Branch (EAB) of the Ministry of Agriculture. EAB prepares and delivers messages to farmers using radio, print, and mobile vans (carrying films for night-time use and puppet shows for daytime use). Of the approximately $6 400 000 per year that agricultural information services cost Malawi (or $6.80 per farm household), about 78% is for agricultural extension, about 12% is for farmer training centers, and about 10% is for the media provided by EAB.

After describing agricultural information services, the paper assembles available information concerning media effectiveness and costs. A number of studies were reviewed concerning sources of farmers' information and how much had been learned from media exposure. In one study, 67% of respondents listed extension workers as a source of agricultural information, 8% listed training course attendance, 27% listed radio, 9% listed films, and 2% listed puppets. Other studies have indicated that, even though radio and films are carrying a lot of information already known to farmers, they also communicate effectively; farmers learn from both these media and they are popular. Finally, even though results of all the effectiveness analyses must be received with some caution, there is evidence that the information services can pay off in improved productivity. In Annex A, for example, several agricultural production functions are estimated from a Malawian data set of 300 farmers, from which it appears that the more educated farmers tend to have more contacts with extension agents and that farmers with more contacts with extension agents tend to have better yields and are more likely to produce cash crops (but not at the expense of subsistence crops).

The paper's analysis of costs found, not surprisingly, dramatic differences in the costs of different ways of reaching farmers. Agricultural extension agents were estimated to cost about $21 per farmer contact; residential training centers cost about $30 per farmer for a five-day session; and day training centers cost about $4 per farmer for a one-day session. The EAB's films cost about $0.17 per farmer contact-hour (a mobile van will typically show 2 or 3 hours of films on a given night in a given place); the puppet shows (lasting about an hour) cost about $0.08 per viewer. Radio's costs, at about $0.004 per listener-hour, are by far the lowest of any medium. Put slightly differently, the paper estimates that mobile vans (film and puppet shows) cost about 44 times as much per contact-hour as radio; and extension agents cost 55 to 80 times as much as mobile vans.

Economies from mass outreach are evident. What is less clear, in Malawi and elsewhere, is how best to make the mass media complementary to face-to-face methods. Nonetheless, even if there were severe limits on the amount of information carried by the radio programmes, it is hard to resist the conclusion that the broadcasts are highly cost effective. This conclusion has implications for Malawi; and it has perhaps more important conclusions for other countries, which, unlike Malawi, at present make almost no use of radio for reaching farmers.

BACKGROUND

When Malawi was nearing independence, it was described in Britain as having no assets except its scenery and an educational system so patchy that there were only a dozen graduates in the whole country. Life President Banda, at one time feared by the British as a revolutionary, has argued consistently and successfully that Malawi's gold lies in its soil. With a firm government, extensive international aid, and fair soil and rainfall, Malawi has concentrated on rural development with the result that it is now a significant exporter of ground-nuts, maize, and tobacco.

Until recently, Malawi has pursued a dual strategy to raise agricultural productivity. In four parts of the country (Lilongwe, Shire Valley, Karonga and Lakeshore), integrated rural development projects were set up between 1968 and 1974 and resources concentrated in these. For the rest of the country, an agricultural extension service was developed; its staff in 1977 was 1 776. At the same time, a single marketing corporation, the Agricultural Development and Marketing Corporation (ADMARC) was established to buy all the cash crops throughout the country and to sell agricultural supplies. More recently, the four integrated rural development projects have been incorporated with the regular work of the Ministry of Agriculture and Natural Resources which now operates in eight agricultural development districts. In the long run, this will reduce the disparity between the project areas, where the supply of resources and staffing ratios for agricultural extension have been relatively generous, and the rest of the country.

In an attempt to increase the effectiveness of its agricultural extension service, Malawi has for more than twenty years run an 'Extension Aids Branch' (EAB) which uses printed pamphlets, radio and mobile cinema vans. This report assesses the significance of the Extension Aids Branch.

AGRICULTURAL EXTENSION AND TRAINING IN MALAWI

Agricultural extension in Malawi has developed three techniques for reaching farmers: through individual or group visits to farmers by field assistants; by teaching farmers at day or residential training centres; and through the Extension Aids Branch. Table 1 sets out the basic facts about each. The two subsections of this section describe agricultural extension and the training centres; the next section describes the EAB.

Agricultural Extension

In the country as a whole, there were in 1977 1 388 field assistants, and 15 residential centres (World Bank 1980, pp. 30 and 35); in 1980, there were said to be about 75 day training centres. There are more training centres and a better ratio of field assistants to farmers in the four former project areas than in the country as a whole. Nationally, the ratio varies between 1:500 and 1:1500 or even more. Within the former Lilongwe Land Development Project (LLDP) it is about 1:600; we can take this area as an example to illustrate the structure in which the field assistant is working (see Figure 1).

For agriculture, the country is divided into eight agricultural development divisions, of which the Lilongwe Agricultural Development Division, for example, is one. This division is then divided into six project areas, whose project managers report to a programme manager. Each project manager is usually a graduate in agriculture, having followed a degree course, generally at the University of Malawi. The development officers have a diploma in agriculture, which is awarded after a three-year course. Entry to this course, as for a degree course, is the Malawi

Table 1: Agricultural Information Services in Malawi

Service	Outreach	Approximate Costs[a]	
		Total Annual	Per Unit
Agricultural Extension Agent	There are approximately 1,400 field agents providing about 240,000 contacts with farmers per year.	The cost is about $4.97 million per year.	The cost is about $20.7 per farmer contact.
Farmer Training Centers (Residential)	There are 30 residential centers providing for 12,000-17,000 men and women farmers and 3,000-4,000 staff each year for 85,000 student days[b].	The cost of residential training centers is about $0.515 million per year.	The unit cost is about $30.4 per person per week (5 days).
Farmer Training Centers (Day)	There are 75 day centers providing about 70,000 person/days teaching annually[b].	The cost of day training is about $0.284 million per year.	The cost is about $4.1 per farmer per day.
Extension Aids Branch (Radio)	About 4-1/2 hours per week are broadcast by Malawi Broadcasting Corporation, reaching about 30% of the population.	The total cost is about $0.271 million per year.	The cost is about $1,160 per broadcast hour or about $0.0038 per listener hour.
Extension Aids Branch (Mobile vans - films)	There are 17 mobile vans providing 2.5 hour cinema show, reaching an annual adult audience of 765,000[c].	The total cost is 0.322 million per year.	The cost is about $0.17 per viewer hour.
Extension Aids Branch (Mobile vans - Puppet shows)	The same 17 mobile vans provide puppet shows for an adult audience of 1,040,000 per year.	The total cost is $0.089 million per year.	The cost per viewer is about $0.08.
Extension Aids Branch (Print)	There are 30,000 literate farmers who receive printed material.	The total cost is about $0.067 million per year[d].	The cost is $2.33 per farmer.

a/ Malawi Basic Economic Report Annex: Agriculture Smallholder Sector, para. 3.35.

b/ ibid, para. 3.34.

c/ The figures are extrapolated from EAB's experience with 12 mobile vans in 1972-78.

d/ The cost of print support for agricultural extension agents, 0.070 million, is included in the cost of the extension agents, rather than in EAB print costs.

e/ Data on EAB costs come from the cost section of the main body of this paper; the data on other costs come from Annex B.

f/ There may, of course, be more literate farmers than this, and each copy may be read by more than one person.

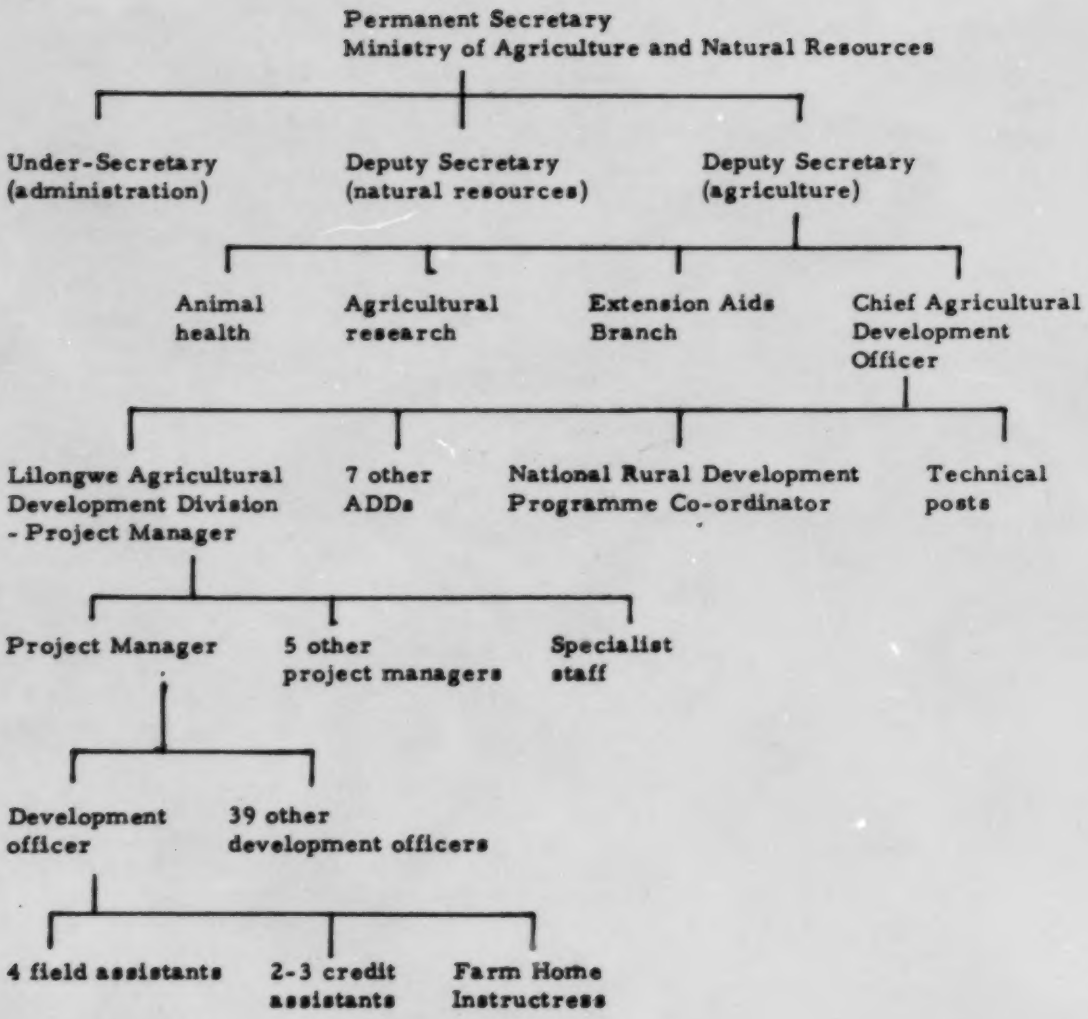

Figure 1: Organisation of extension staff a/

a/ We understand that the organisational structure has been reviewed and this chart is now out of date.

Certificate of Education, which is taken after four years of secondary education. At the next level down, field assistants are trained for two years at the Colby College of Agriculture and the entry qualification for their course is Junior Certificate taken after two years of secondary education. Education brings better transport as well as better jobs. Project managers are each provided with a vehicle and development officers with a motorbike. Field assistants are expected to travel by bicycle and are paid a bicycle allowance of K 3.50 per month. The cars are said to average 2 400 kilometres a month and the bicycles 1 280.

The field assistant's key activity is to demonstrate better agricultural practices to individual farmers or to groups of farmers. In theory, he does this partly by cultivating demonstration plots himself, partly by actual demonstrations on his farmers' lands, and partly by reiterating the advice passed down to him through the hierarchy of agricultural extension. In the past, extension workers have been encouraged to concentrate their efforts on progressive farmers, achikumbi. There seems to have been a move away from this approach and towards group demonstrations and advice. The 1978/79 Guide to Agricultural Production says:

> 'The achikumbi programme has been given top priority by Extension staff since it was introduced. Field staff are aware that farmers must be of the highest agricultural performance if they are to receive the title "Mchikumbi" and that they should be real leaders in the field of agriculture. Achikumbi are established farmers who have shown over a period that they are fully entitled to the honour. All agricultural staff should encourage as many farmers as possible to reach the high standards required to qualify as Mchikumbi.
>
> In recent years, groups of farmers have got together in order to organise themselves in various ways that can help them to achieve better standards of farming.
>
> Many of these groups have been formed to facilitate the purchase of fertilizer and improved seed, and some well established groups have been able to obtain credit for this purpose. Such groups or farmers' clubs have also often organised concerted plans for agricultural development in their local area. The Government welcomes this development. A strong local group of farmers interested in improving their standards of farming gives the staff of the Extension Service a good chance of helping more farmers effectively.
>
> .....
>
> Selection of achikumbi is a continuous process. 380 achikumbi have so far received certificates, and His Excellency the Life President is Malawi's Mchikumbi No. 1.'

But field assistants have other jobs. They are the main contact between the farmer and specialist services of the Ministry of Agriculture, such as advice on forestry. The field assistant also has the job of encouraging farmers to attend one day or residential courses. He accompanies the yellow mobile cinema and puppet van when it visits his district and gets a spot of publicity for himself and his messages by taking the microphone after each puppet show. And he submits weekly returns of activity to his development officer. He does not, however, deal with credit--the function of a cadre of untrained credit assistants--nor does he supply seed or fertilizer, which are sold through ADMARC. And

he does not teach women; despite the relatively high number of female heads of households, role segregation is seen as a reason why male field assistants should not teach women farmers. There is a small cadre of Farm Home Instructresses, but their work is mainly, though not solely, in teaching nutrition, cookery, needlework and health, rather than agriculture.

It is not possible to be precise about the field assistant's work. In Malawi, as in many other countries, field assistants are criticised for concentrating too much on wealthy farmers. The system of reporting is inadequate; one development officer we asked did not know which activity should go under which heading on the report form which he submits regularly month by month. As far as we could discover, no studies appear to have been made of the day-to-day activities of field assistants.

At the next step up the hierarchy, the development officer may control a staff of about a dozen. At Nathenje in LLDP, for example, there are four field assistants, three credit assistants, one farm home instructress, two labourers who work on the demonstration farm, a messenger and a clerk. The office is housed in a substantial building on the main road. In the development officer's office, there is a desk with a set of wooden trays, a notice board, two cash boxes, one for regular sales and one for credit, half a dozen chairs and unusually a telephone. He splits his time between supervising his staff and planning their work, visiting villages, teaching on one-day courses, and keeping in touch with the higher levels of the extension service. He attends regular meetings every quarter/month with his project manager, at which his work is guided and he is told of the subjects which Extension wants stressed to farmers over that period.

We will return later to consider the effectiveness of this quite orthodox, approach to agricultural extension.

Training centres

The second main way of teaching farmers is through day and residential training centres. Throughout the country, there were, in 1974, 59 centres: there are, of course, more in the areas of the former land development projects. In the former LLDP area, for example, there are four residential training centres and six day training centres. In the year 1979/80, for an estimated 100 000 farm families they ran courses as in Table 2.

Table 2: Use of residential and day centres in LLDP area 1979/80

	Staff			Public		
	Men	Women	Total	Men	Women	Total
Residential centres	7 437	1 317	8 754	9 877	9 411	19 288
Day centres	-	-	-	31 258	37 760	69 018

The subjects of residential courses included home economics, credit procedure, forestry, fruit trees, land allocation, ox training, and general agriculture. The courses offered at one day training centres in Lilongwe division for the period February-July 1980 are in Table 3. Three courses--on crop storage, family health and horticulture--were for both men and women:

Table 3: Courses at Nathenje training centre February-June 1980

Course subject	No of courses for men	No of courses for women
Animal husbandry	3	-
Child care	-	2
Credit	1	-
Crop husbandry	5	-
Crop storage	1	1
Family health	2	3
Farm management	3	-
Forestry management	2	-
Home improvement	-	5
Horticulture	5	2
Land husbandry	3	-
Laundry	-	3
Needlework and handcraft	-	8
Nutrition and cookery	-	6
Poultry keeping	-	1
Preparation for display	-	1
Revision	5	1
	30	33

Courses for farmers are free, as is accommodation and food at residential training centres. Each residential centre has a demonstration farm so that costs can be kept down by growing food for courses--though horticulture demands expensive watering in many parts of the country. The centres try to provide nutritionally well-balanced meals, seeing the teaching of nutrition along with agriculture as one of their proper functions. Courses at day training centres are taught mainly by field extension staff while each residential centre has a principal and resident teaching staff.

EXTENSION AIDS BRANCH

Beyond these two traditional ways of instructing farmers, Malawi has, since 1958-59, used mass media organised through its Extension Aids Branch. It began as a one-man public relations unit from the Ministry of Agriculture and Natural Resources to provide publicity material to support the agricultural extension services (Extension Aids Branch 1978, p. 1). The unit soon grew to have a public relations officer, a senior agricultural instructor and a dark-room assistant. In 1960, it began producing leaflets and two weekly radio programmes. For two years, it worked under the control of the Department of Information before moving back to the Ministry of Agriculture in 1962 and being expanded. Further expansion came in 1966-67 when British and American aid funds paid for printing equipment (still largely in use today). In 1968, the Branch set up a film unit so that it was capable of producing and distributing film as well as print and radio programmes. In order to raise the effectiveness of its work, the Branch started in 1976 Evaluation and Action Research Unit, whose function was to pre-test material produced by the Branch. Today the Branch has an establishment of 76, to whom some 62 are actually in post, together with some 30 non-established staff, and consists of eight sections: publications, editorial, radio, technical (which runs the mobile vans), photographic, cine, evaluation and central administration. Its functions are defined as 'to provide educational teaching material for the Ministry

of Agriculture and Natural Resources, plus other Ministries to some extent, to create an interest in rural people in modern farming methods and to encourage them both to increase production thereby improving rural living standards. It is also concerned with the health and proper nutrition of rural people and works closely with other extension services.'

More specifically,

'- It provides mass coverage through the radio;
- It compiles extension literature;
- It provides visual material;
- It provides maintenance and mobile cinema services;
- It provides movie films;
- It provides media evaluation services; and
- It undertakes printing services for written media.'
(Extension Aids Branch 1979, p. 1)

It is housed in a standard office block three storeys high, about 40 metres by 10, indistinguishable at first glance from others in the capital. This has been its home since 1973. At the back is a line of mouldering yellow Land Rovers, half hidden under the trees. EAB has wisely got permission to keep its vehicles when they are scrapped in order to use the spare parts. Inside too, it looks at first sight much like any other office, apart from a display in a glass cabinet of the Branch's publications on sale. Its activities are quite different. Its staff are set out in Table 4.

Publications section

The largest number of staff is concerned with print. The publications department is divided into four sections--editorial, typesetting, graphics, and printing. The editorial section has the job of preparing the text of everything to be printed by the Branch, and of writing the puppet plays which are to be performed in the mobile vans. Its three staff thus divide their time between translating material drafted in English into Chichewa, preparing text for farmers' magazines, checking and proofreading and writing the puppet plays. This last activity takes about one man/week in each month, in which time the texts of eight plays are produced. Otherwise, by far the largest job of the section is the preparation of the bi-monthly farmers' magazine Za Achikumbi. It runs to 16 pages (255 x 190 mm) and is now printed in an edition of 32 000 copies and circulates to extension staff and to literate farmers. The text consists of advice to farmers appropriate to the time of year when it is published. To select topics for inclusion, the editorial staff may refer to the cropping guide, to the annual radio programme guide, which sets out the subjects for broadcasts, and make a request for guidance to project managers. While articles can come from a variety of sources, it in fact falls to the editorial staff to generate a considerable amount of the copy themselves. The Branch also publishes four magazines in English on behalf of the Land Development Projects. Beyond that, it prints posters, leaflets and handbooks on the production of different crops. A handbook on cotton, originally produced in 1971 and revised in 1976 was, for example, being reprinted at the time of this report, and a handbook on coffee was to follow it. Appendix 1 shows the main production jobs for 1978.

Drafts produced by the editorial section are then typeset; an IBM composer has just been added to the range of typewriters used by the Branch, which will enormously aid the production of material with the

Table 4: Extension Aids Branch Staff

Section	Establishment	In post - May 1980
Administration	15	1 head of branch 1 assistant head of branch 1 executive officer 1 senior clerical officer 2 clerical officers (+ 1 away on training) 2 copy typists 1 stenographer 1 head messenger 3 messengers 2 watchmen
Editorial	4	1 head of section 2 (+1 away on training)
Publications	32	1 head of section 1 assistant press supervisor 1 senior typesetter 3 typesetters 1 graphic artist (+1 away on training) 6 graphic assistants 8 printers 7 collators 2 press workers
Photographic	3	1 photographer 1 photographic assistant
Cine	6	1 head of section/script-writer 1 cameraman 1 assistant cameraman 1 sound recorder 1 librarian/commentator
Technical	34	1 head of section 1 maintenance officer 2 maintenance assistants 2 carpenters 15 driver/operators 13 puppeteers
Radio	10	1 head of section 4 recording assistants 5 radio correspondents in field
Evaluation and action research	8	1 counterpart head (+ counterpart away on training) 1 technical officer 6 enumerators

right hand margin justified; at present this is achieved by laborious dual typing of manuscripts. Titles are added with the aid of a headliner and the copy made up by the graphics section who pass plates on to the printing section. Here a team of eight printers operate three ageing and small presses (capable of taking A3 size paper at a maximum); the greater part of their time, too, is spent in producing the various farmers' magazines. A team of eight collators put printed material together by hand. The head of the publications section controls the flow of work through its various stages.

While the photographic section is organisationally separate from publications, much of its work feeds into the publications section; still photographs are commissioned by the section, and photographs from their collection are selected to illustrate magazines and reports. Two photographers use 35mm (Pentax SLR) and 6 x 6 cm (120 dual lens reflex) formats for both black and white and colour slide still photography.

Technical section

The technical section operates a fleet of mobile vans--Land Rovers converted to show cinema programmes and puppet plays throughout the country. There are 17 mobile vans in all, of which four are attached to the former Land Development Projects so that the Technical Section in Lilongwe employs 13 drivers and 13 puppeteers. Its staff at Lilongwe convert and maintain the vans and their equipment. They are then sent out for a series of two to three week campaigns in which they show the same programme of films and puppet shows in villages chosen according to a programme agreed by the local field extension staff. Thus, while there is a centrally produced programme showing the area in which each van will operate for each campaign, the details of each van's day-to-day schedule are arranged by local field staff.

The vans are ordered from British Leyland in England and four adaptations are made by the factory: an oil cooling system and a governor to control engine speed are added for use when the vehicle is stationary but with the engine running to drive a generator; a heavier back axle is fitted; and a power take-off unit fitted. A contractor in Lilongwe fits a generator so that the cine projector can be run from the vehicle. The technicians and carpenters at EAB then instal a tape recorder, to carry music and the dialogue of puppet plays, amplifier and loudspeakers, and a puppet stage at the back of the vehicle. A cine projector and folding screen are also carried. The cost of the conversion is kept down by doing as much work as possible at EAB.

The vans are operated by a team of two--a driver/operator and a puppeteer. Each van goes out for a campaign of two to three weeks, carrying films and puppet plays on a set of topics appropriate to the agricultural season. Appendix 2 shows, for example, the schedule for the four vans operating in the northern region for 1980. At the beginning of the campaign, the van drives from Lilongwe to the selected area and reports to the local agricultural supervisor. He, or a field assistant, then accompanies the vehicle. It drives to a village using its loudspeakers for music and announcements to advertise the puppet plays which are shown in four or five different villages during the day time. The plays usually consist of dialogue and agricultural practice between a farmer and his wife, or a farmer and a field assistant. The puppeteer operates the glove puppets for which he has had a two or three week training, but the dialogue is given from a tape recording and broadcast on the loudspeakers. Little attempt has been made to introduce a story line into the plays. At the end of each performance, the field assistant uses the loudspeaker in order to reinforce the advice given in the play.

As the vans drive round, they announce over the loudspeaker where they will show films that evening. After sunset, a screen is erected and a two to two and a half hour programme of films is shown. The majority of the films are those made by the cine department of the Branch; single concept films on improved practice for a particular crop, or on the use of fertilizer, or marketing, for example. Along with them, some advertising films may be shown together with old newsreels, occasional documentaries often from embassy film libraries and the like. And, in many programmes, a film from the Malawi Department of Information is shown. Usually these are appreciably longer than the Branch's own films.

At the end of the campaign, the vehicles return to Lilongwe for servicing and preparation for the next campaign some ten days to three weeks later. The vehicles remain at headquarters during the heaviest period of agricultural work, from December to February.

Cine section

'Before the (cine) Section was established, there were very few films on Agriculture, and worse still, the films were in English, which made it difficult for the farmer to understand.' (Extension Aids Branch 1978, p. 8). In 1968, EAB therefore established its own film unit which today produces up to fifty films a year. The staff were trained on the job by a small team from the University of Missouri. Having experimented with a variety of formats in the past, the unit now produces mainly single concept films, which generally run for about ten minutes; occasional films are longer, and a few are made on commission for other government departments.

The unit is equipped with three Bolex 16 mm cameras and two Auricon (sound) cameras. The complexities of recording sound at the same time as filming are such that the Auricons are no longer in use. In 1979, the Branch bought a Steenbeck console editor; all editing of films and the preparation and dubbing of sound tracks is done at the Branch. Films are sent to a commercial laboratory for processing--Malawi is now again sending them to Zimbabwe for this--and once they have been edited and dubbed, the master is then also sent for prints to be made. 22 copies of each film are usually made, and each copy is then used for about five years, with perhaps eighty showings during this time. Films are generally produced in colour with a soundtrack in Chichewa.

The Branch does not employ actors, but gets farmers to demonstrate agricultural practices which adds conviction and realism to the films. It manages to achieve a shooting ratio of 3:1. Many films are on particular agricultural techniques - 'Tobacco barn building and repairs' or 'Cotton weeding' or 'Rice management' or 'Visoso' (slash and burn cultivation), for example; others are more general. And some go beyond agriculture: 'Nkhokwe construction' describes methods of grain storage - 'Use clean water' and 'Eat more eggs' are self-explanatory.

Radio section

The Branch produces four-and-a-half hours of broadcasting each week for six radio programmes:

> Farm forum is the key agricultural programme, dealing each week with agricultural topics felt to be of particular importance for that week in the agricultural year. Its content is a guide to the material prepared for the other programmes as well. (Broadcast on Monday,

repeated on Wednesday, from 1312 to 1400).

Modern farming is a general programme, making considerable use of interviews with farmers. The Branch employs two full-time and one part-time field worker who collect recordings for this and other programmes. (Broadcast on Tuesday, repeated Friday, 1320-1400).

Cotton is an eight minute insert within Modern farming consisting of a talk about cotton production and marketing.

Farmers request programme is a music request programme, whose principal functions are to provide entertainment and associate EAB in the mind of listeners with a popular programme. (Broadcast on Thursdays, 1310-1400).

Farmers' notebook is a title for a series of short (two to three minute) radio news spots dealing with current activities of farmers, credit, cattle market arrangements and so on. (Broadcast between 0500 and 0600 daily).

Ophiri is a farming family serial produced by the Malawi Broadcasting Corporation (MBC) using information from both EAB and from the Ministry of Health. (Broadcast on Friday, 1145-1200, repeated Saturday, 1645-1700).

With the exception of Ophiri, all programmes are both scripted and produced by the radio section's staff and recorded in the Lilongwe studio of MBC. The Branch has its own portable Uher tape recorders and two Ferrograph recorders. Programmes are edited at EAB.

All the broadcasters are agricultural extension workers by background, who have been trained in radio techniques and attend occasional seminars at EAB as part of their in-service training. There is one woman producer who, as well as dealing with some agricultural topics, prepares all the material for broadcasts aimed particularly at women.

Evaluation and action research unit (EAR)

The aim of the evaluation unit is not to measure or test the performance of EAB, but to pre-test materials as they are being produced. The unit is the most recently established section of EAB. The idea for it

> first took shape at the Agricultural Extension and Rural Development Centre at Reading University, England, when two of its staff were invited by Extension Aids to advise on methods of evaluating its work. After visits and discussions, the Reading team put forward its suggestions. It did not propose the traditional form of evaluation exercise in which a visiting expert studies the institution, makes an assessment and produces a report with general suggestions for improvement. Instead, the team put forward the idea of a small permanent evaluation unit charged with the task of helping to improve the effectiveness of each media project or campaign during the production stage. (Warr 1978, p. 122).

The unit cannot test all materials produced by the Branch, but selects from those being drafted for radio, film or print. Its team of six enumerators test materials on a sample of the potential audience and recommend any necessary changes to producers within the Branch. While

this adds to the lead time needed for preparing any agricultural campaign, it is intended to increase the effectiveness of all the media used.

Evaluation is often seen as a threat: the EAR unit makes a strenuous effort to gear its research to the needs of producers so that they see its work as helpful and its staff as supportive rather than externally critical. While its role is limited to formative evaluation and to advising on particular topics within EAB's work, it has inevitably gathered a great deal of information about the effectiveness of the Branch's work more generally: we make considerable use of this information below.

Relationships

Strangely, the Extension Aids Branch is no longer a part of the organisational structure of agricultural extension. The various Agricultural Development Divisions (which have taken over from the integrated land development projects) report to the Chief Agricultural Development Officer, as do the technical specialists, and he, in turn, reports to the Deputy Secretary (Agriculture). The Extension Aids Branch also reports direct to the same Deputy Secretary (see Figure 2). In practice, there is, of course, informal cooperation with agricultural extension staff, but cooperation seems neither as close nor as regular as it might be. EAB's other key relations are with Malawi Broadcasting Corporation, where it works with a producer in Lilongwe although MBC's headquarters are in Blantyre, and with farmers. Appendix 2 sets these out.

As we have seen, EAB communicates with farmers through three channels: by radio and yellow vans it does so directly, although the yellow van puppet plays are introduced and followed by announcements from the local field assistant. Its communications through print are necessarily indirect: with a literacy rate estimated at 25%, few farmers could read Za Achikumbi even if they were to receive it. The magazine's major value lies in supporting and stimulating the work of field assistants. Feedback from farmers to EAB presents more problems. In theory, farmers are in close contact with field assistants and comment to them on the work of the Branch. Field assistants meet regularly with their supervisors, and can pass on comments about farmer reaction. In practice, the meetings at which this might happen take place once a quarter, and there is much else on the agenda.

The drivers of the yellow vans report on audience size and can give the cine section an impressionistic view of how particular films are received. The EAR unit was established specifically to guide the Branch—but only on the effectiveness of its materials and not on teaching arrangements generally, or on the content of its work.

Constraints

Before attempting any assessment of the work of the Extension Aids Branch, it is important to note the constraints within which it is working. The first is the constant pressure to maintain the flow of production. Week by week and month by month, the Branch produces its quota of radio programmes and the regular issues of periodicals. Its establishment is below strength and any proposal for it to undertake new tasks must be considered in the light of its existing commitments.

Second, we formed the impression that the Branch suffers from its location. It is physically in a different building from other parts of agricultural extension and, as we saw, now organisationally separate from it. In practice, it seems it has had closer links with LLDP than with the other development projects or other parts of the country, simply because the LLDP

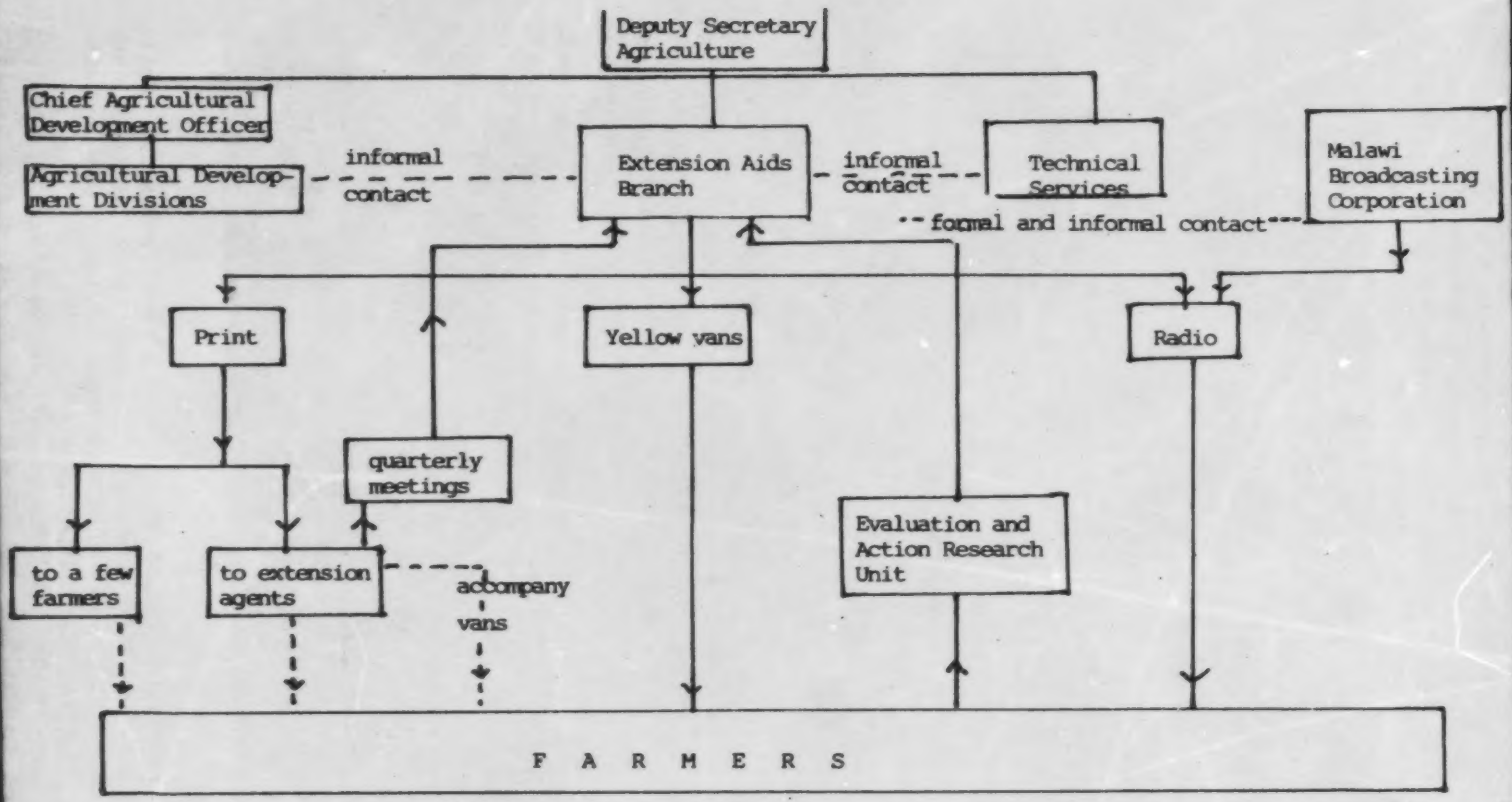

Figure 2: Extension Aids Branch Relationships

offices are close by. It is physically separated from those doing agricultural research and teaching agricultural extension, who remain at Zomba.

There is a third constraint which is more subtle but potentially more serious. In discussions there, the dominant word in many conversations was 'messages'. The Branch seems to be working under the assumption that its role is to send messages to farmers, although agricultural extension thinking generally has moved away from this view of its function. This has consequences for the way EAB's work is planned. It tends to lead to the assumption that all their energies should go into the perfecting of the form of those messages whose content can be determined by the agricultural specialists. In practice, we were told more than once that farmers in Malawi are sophisticated and skilled and, over the last ten years, have moved a very long way from needing simply to be told what to do. And this assumption about messages means that relatively little effort has been made to build systems of feedback into the organization of EAB.

RESULTS

In order to make a full assessment of the work of EAB, one would want to compare the different methods used by agricultural extension to contact farmers, and then look at the effects on those farmers and on their farming practices. Ideally one would then be able to look at the cost of reaching a farmer through radio or through a residential course, for example; look at the effects of that contact on the farmer's production of food and compare the costs. In practice, there are major difficulties in the way of doing so. The most serious is that farm practices and production are affected by many factors other than contact with the extension service. Marketing and pricing policies of ADMARC have a profound effect, for example, on farmers' practices. Furthermore, one of the aims of agricultural extension is to achieve long term changes in farming practices and in the attitudes of farmers; these would not be discovered by an analysis that was based only on increased productivity. In any case, there is in practice not quite enough data to do this comparatively simple comparison. Malawi is, however, fortunate in having a wealth of information about agricultural productivity and about the work of extension services, and the effects of education and other variables on agriculture from the socioeconomic survey of the Ministry of Agriculture, from the evaluation units of the Land Development Projects, and from the Evaluation and Action Research Unit of the Extension Aids Branch. It is on the basis of this kind of information that we can make some estimates of the effectiveness of both EAB and regular agricultural extension; it would also be possible to pursue this analysis very much further and we return to this point in our final section.

Measures of output

We can start by measuring the output of the Extension Aids Branch. While this says nothing about effectiveness, it does give us some key information about the productivity of the Branch. Table 5 sets out the amount of work done by their print department 1972-1978.

The printing equipment in the publications department is old, and both the 1976 and 1978 reports of the Branch refer to delays in production because of the breakdown of machines and difficulties in servicing them. The production of publications was also affected by the amount of work done by the Branch for other departments. Thus in 1976, for example, the editorial section was 'involved in editing and proofreading all

Table 5: Production of print 1972-78

	1972	1973	1974	1975	1976	1977	1978	Average 72-78
Jobs	252	173	193	166	159	191	179	186
Impressions	2,313,878	1,354,705	1,322,914	1,719,640	1,630,911	2,035,920	2,364,992	1,820,423

publication material requested by other departments of the Ministry of Agriculture and Natural Resources. The Section was engaged with production of materials for "Zikomo Kamuzu Show", the Trade Fair and the Malawi Congress Party National Convention.' (Extension Aids Branch 1976, p. 1).

It is more difficult to produce a statistical summary on the work of the radio section. Their number of broadcasting hours has, however, remained constant over the last two years at about 3 hours per week (including Ophiri for which responsibility was shared), 1-3/4 hour repeats or about 156 hours of original broadcasting each year.

Table 6 sets out the number of films produced over the same period 1972-78.

Table 7 sets out the activity of the mobile units of the Branch. These figures show only the activity of the mobile units controlled directly at that time by Extension Aids Branch and not the work of the units controlled by Land Development Projects. No figures are available for the number of puppet shows or the audiences at these. It seems likely, however, that there were about three times as many puppet shows as film shows. The annual audience for puppet shows was probably between one and two million people a year; it is also almost certain that a larger proportion of the audience were relatively small children. At the first puppet show we saw, for example, we estimated the audience at 20 men, 20 women, and 40 children.

The audience

There is little information on the audience for EAB's printed materials. As we have said, the main value of these must lie in keeping the agricultural extension service informed rather than in communicating directly with the farmers. But it is important to stress that the magazine Za Achikumbi and the programme guides for radio programmes and for the mobile cinema vans are key planning documents for the extension officer's work. The work of regular face-to-face extension and the use of vans and radio would be seriously affected if such publications were not produced.

Evidence about radio listenership is rather fuller. The EAR Unit carried out a series of studies of radio between 1977 and 1979, and found that one third of farmers claimed to listen regularly. They thought that this was probably an overstatement, and also knew that their samples were biased towards men and towards the more educated. In the areas in which they carried out their survey, 20-30% of households had radios, and a further 30-40% listened fairly often to somebody else's radio. From a wider set of EAR studies, it seems that 27% of farmers in their samples had learnt agricultural information from radio programmes. Gausi (1978) found that fewer people owned radios in nine villages of Lilongwe Land Development Programme where he carried out his research, and suggested that radio ownership there was only 10%. This contrasted with an earlier study by Phiri (1975) which suggested that 22.5% of people had radios and 32.5% listened to them. Discussion at MBC suggested that agricultural programmes were very popular. There is of course, a danger that these figures may be distorted by the respondents' wish to be courteous to enumerators from the Ministry of Agriculture, but EAB try to guard against this. All in all it seems reasonable to conclude that in those parts of the country where MBC's signals are clearly received, about 30% of farm families hear some of the Branch's broadcasts.

The figures in Table 7 suggest that nearly a million people a year see films shown at one of the mobile units. Driver/operators keep a record of audience numbers, and a check by the EAR unit confirmed the

Table 6: Production of films 1972-78

	1972	1973	1974	1975	1976	1977	1978	Average 1972-78
No. of films shot	57	58	42	22	45	50	60	48
Total minutes	162	160	169	100	150	167	197	158

Table 7: Mobile units 1972-78

	1972	1973	1974	1975	1976	1977	1978	Average 1972-78
No. of units	10	11	12	12	12	12	12	
Film shows	1,084	1,200	1,117	1,089	1,833	1,191	1,738	1,322
Total audience	1,189,200	1,236,000	876,059	1,001,535	718,222	889,154	428,154	905,455
Audience per show	1,097	1,030	784	920	392	747	246	685
Audience per van	118,920	112,364	73,005	83,461	59,852	74,096	35,668	78,249
Distance travelled (km)	266,848	311,758	290,253	280,948	271,149	233,903	172,393	261,036
Distance per van (km)	22,685	28,342	24,188	23,412	22,596	19,492	14,366	22,559

accuracy of their estimates. The sharp decline in audience between 1977 and 1978 is unexplained. EAR Unit studies have also shown that there is a considerable variation in the composition of the audience in different villages with the proportion of children varying between 19 and 30%. Their studies suggest that an overall average would be of the order of 32% men, 29% women, and 39% children. While an earlier study suggested that film vans were reaching about 10% of the population, an EAR study at Manyamula in the Mzimba district found that 'about half those respondents living at or near the film show site actually attended the films'. (EAR Unit, n.d., p. 10). A third of the audience here had not been to school and another third had left school at or before Standard 5. It seems reasonable to conclude that the film vans were successful in reaching a large proportion of the population and in teaching poorer as well as wealthier farming families. We can assume that there are advantages for children in learning something of agriculture from the film vans. And, in view of the fact that agricultural extension is directed almost exclusively towards men and not to women, the presence of women in the film van audience is important.

Did they learn anything?

Studies by the EAR Unit show that many farmers were already familiar with what was being taught by film or radio. In a pre-test of a film to be used in a campaign on growing maize, for example:

> Practically all the respondents who saw the film had grown maize last season. Comparatively few said that they had learned anything new from the film .... During our tour of the test areas, it became clear that maize stooking is commonly practised so that, to some extent, the film was preaching to the converted. (ibid. p. 4)

Similarly, their radio study found that:

> In the two samples of audiences being urged to prepare their gardens early, 30% and 40% respectively said that they were already doing so. Similarly, 24% and 60% were already stooking their maize, 35% and 32% had used the recommended method of determining when to harvest cotton, 33% had used two bags when harvesting, and 15% had tried Actellic before. (EAR Unit, 1979a, p. 11)

When a practice is already widespread, it is impossible to determine just why it has been adopted, or to compare the channels through which information about it has been passed.

The EAR Unit drew the conclusion that 'A decision should be made jointly by EAB and the extension service as to whether it is appropriate to continue to preach only these messages when we know that about a limit of the target audience is already converted.' (ibid) There is a further difficulty in choosing the content of EAB's work: crops and agricultural conditions vary from one part of the country to another, so that advice which is appropriate in one part of the country may not be appropriate in another. Difficulties therefore arise for the Branch in running an effective service--and for outsiders in assessing its work--and do so very largely because of the didactic form of much of its work. As the EAR Unit says:

> Most of the messages in the test programmes were aimed at persuading the target audiences to adopt some practice (e.g. prepare gardens early, pick cotton according to certain rules, apply Actellic). Often these messages were inappropriate. In some cases, they simply did not apply to large sections of the target audience (e.g. the time of the broadcast was wrong or farmers did not use the methods or equipment mentioned). In other cases, the recommendations had already been adopted, often by about a third of the test audience or more. Frequently, too, respondents said that the messages in the test programmes contained nothing they did not already know. (The messages were in these cases apparently redundant.)
>
> (EAR Unit 1979b, p. 2)

The Unit's work has, however, shown that farmers can, and do, learn both from film and from radio. Tests of a film on an alternative way of planting millet to the traditional slash and burn technique (visoso) found, for example:

> Two-thirds of the respondents said that they had learned something from this film (a much higher proportion than for the maize film). Of these respondents, a large proportion (nearly two-thirds) said that they had learned about planting on ridges. A much smaller proportion said they had learned about the use of fertilizer. These responses were substantially confirmed by our other findings as will now be seen. An important set of messages in the film is concerned with the modern methods of planting finger millet. The messages are listed below together with the number of respondents who knew them before and then after seeing the film.

Response/message	No. of respondents giving correct message before film show	after film show
(a) plant finger millet on ridges	9	48
(b) plant in two drills	2	23
(c) make the drills 6 inches apart	0	3
(d) apply fertilizer 3–4 weeks after germination	1	31
(e) use sulphate ammonia	2	11
(f) apply at the rate of 200 lbs per acre	1	6
(g) rotate with other crops	3	0

(Total number of respondents = 52)

> These figures suggest that the film did have a significant effect where some messages were concerned (although we could not prove this statistically in all cases). In particular, the recommendation that finger millet should be planted on ridges (the visoso method involves broadcasting seed on flat beds) was well communicated. Whereas only 9 out of 52 respondents know this before the film, the majority did so afterwards. (EAR Unit, n.d., p. 5)

The film was less successful in communicating the more complicated ecological arguments for abandoning traditional methods of cultivation.

Similarly, studies of the recall of information in radio programmes showed that 65% of respondents were able to give correct responses to seven questions requiring single responses on a test programme. As one would expect, lower results were obtained on multiple response questions (e.g. 'What reasons did the announcer give for preparing your gardens early?') (EAB, 1979a, p. 9). Few of the respondents could remember all the arguments stated in a programme - a finding which is consistent with other radio studies elsewhere. But these studies, designed to improve the effectiveness of the Branch's materials rather than as part of a media research programme, confirm that the methods can be successful in communicating with farmers.

In a number of studies, the EAR Unit has asked farmers where they obtained information about agricultural extension. The results are shown in Appendix 3. A summary of this table suggests the results in Table 8.

Table 8: Sources of information to farmers

Source	Percentage of farmers
Extension worker	67
Radio	27
Film	9
Puppets	2
Za Achikumbi	1
Attendance at course	8
Other	14

(Total adds to more than 100 as more than one source mentioned by some respondents).

These figures must be treated with caution. If asked a question about the source of information, especially by an enumerator from the Ministry of Agriculture, respondents are likely to mention one or other of its activities as the source. As we will see in the next section, many farmers have little direct contact with extension agents and the infuence of extension workers may well be over-stated by these figures. But, for what they are worth, they suggest that radio is used as a source of information on agriculture by about the same proportion of the population as it is reaching. The mobile cinema vans are reaching about 20% of the population a year, and something like half that number are learning something from the van's programme--a high proportion if we bear in mind that many months or years are likely to elapse before a film van revisits any one village.

There is one final point to be made about learning. Generally, we learn most effectively if we enjoy doing so. The EAR Unit studies showed that both radio programmes and the Branch's films are enjoyed. Audiences watch the film shows--and indeed the puppet shows--with interest and concentration. Agricultural films are popular: in their Manyamula study, the unit found that 'the film on football was the best liked entertainment film, but it still took third place to the films on maize and visoso' (EAR Unit, n.d., p. 10). This matches closely with experience in Kenya where a film on the maize stalk borer proved the most popular in a mixed programme (Potts and Troughear, 1977). And it fits with our own observation: the audience at Wimbe seemed to enjoy most an old newsreel of football, to which the driver/operator added his own live commentary in Chichewa, turning down the English commentary on the film, and the agricultural films.

We can sum up then that, while films and radio programmes alike are carrying a lot of information which is already familiar to farmers, they can communicate effectively. Studies have shown that farmers do learn from both these media, that both are significant as sources of agricultural information, and that they are popular.

A comparison with the work of extension officers

We can make some rough comparisons between the work of EAB and the activities of the extension service. Much of the detailed evidence about the work of extension workers comes from the (former) LLDP where there have been in recent years 500 farmers to each extension officer; in other parts of the country the ratio was reported in 1975 as 1:1200-1300 (Lele 1975, p. 66), and more recently as 1:1400-2400 (World Bank 1980, p. 28). On average, for the country as a whole, the figure appears to lie between 600 and 700. We must assume that the proportion of farmers visited by extension agents outside the development project areas is substantially lower than the LLDP figures. Within LLDP, in 1978/79, only 30% of groundnut growers were given extension advice (though 43% had received advice in the previous year) (LADD Evaluation Unit 1980b, table 15), 30% of farmers had attended a day training centre and 3% both, while 61% had not attended one at all (LADD Evaluation Unnit, n.d., table 6). Total annual attendance at day centres has been estimated at 70 000 student days; 7 000-10 000 men and 5 000 to 7 000 women attend a residential centre in a year (World Bank 1980, p. 30). Despite the figures quoted in the previous section, from EAB's evaluation work, we can assume that most farmers have no contact with an extension agent even within LLDP. Outside LLDP, the proportion of farmers having contacts with extension agents is much lower. According to the data from Annex A, around 10% of farmers in the two samples have been visited for the past 12 months.

We also have some evidence about the farmers who are in touch with extension agents. First, few women get help from extension agents although, as Uma Lele points out:

> In many traditional societies, it is the custom for the women to provide the major support for themselves and their children, either by supplying the family with home-grown food, or by obtaining cash through the sale of their own produce. Perhaps an even more important indication of the woman's role in agriculture is the fact that a large percentage of rural households is headed by women.
>
> Agricultural extension programmes have frequently overlooked the importance of women, both as major contributors to the farm labour supply and as significant family breadwinners.
>
> (Lele 1975, p. 77)

She reports also that in Malawi 35% of rural households are headed by women (ibid).

There is also some evidence from LLDP that farmers with larger holdings were more likely to receive credit from the project and to have contact with extension (LADD Evaluation Unit 1979, p. 3; and Annex A). Similarly, those attending courses tended to be farmers with larger holdings and with more education (ibid). As with many other extension services, that of Malawi tends to visit the wealthier rather than the poorer farmers.

In the absence of local studies, we cannot estimate the proportion of the time which extension agents spend in touch with farmers, nor the number of farmers they contact. Studies in Kenya, where the

extension service was organised on lines very similar to that of Malawi, suggested that extension agents might spend only 2.9 days a week visiting farmers, and that each probably visited fewer than two farm families in a day (Leonard 1977, p. 32). If figures of this kind were applied to Malawi, they would confirm that very many of the country's 850 000 farm families have no chance of being visited by extension agents. And there is little chance of increasing dramatically the number of extension agents: it proved impossible to reach the planned ratios of 1:200 even within the development project areas.

Concerning the effectiveness of agricultural extension, there are two studies. An LLDP study found a significant correlation between extension contact and the production of hybrid maize (+ 0.3, significant at the 0.05 level), but no significant correlation for either local maize or groundnuts (LADD Evaluation Unit 1979, p. 1). Interestingly, there was also a correlation between being a woman farmer and yield of both local and hybrid maize (+ 0.3 in both cases, significant at 0.02 and 0.05 levels respectively). This is unlikely to have been the result of extension contact; rather, it is suggested that families with a woman as the head of household are unlikely to have enough labour to cultivate tobacco, so that maize is a more important crop for them than for many households with male heads. In the case of groundnuts, where extension's advice concentrated on ridging, weeding, and the selection of the best variety for cultivation (plant population), Table 9 shows that hardly any farmers needed advice on the first two points; on plant population, slightly less than twice as many farmers who had received extension advice were following recommended practices as were those who had received none. But 86% had received no advice and some of the energy that went into giving advice about ridging and weeding might have been better spent on the question of plant population. Annex A shows that, if we hold constant the amount of land cultivated, contact with extension increases production significantly and increases the probablity that a farmer will grow cash crops (groundnuts, cotton and tobacco) without this being at the expense of subsistence crops.

Table 9: Interaction between groundnut farmers and extension agents, LLDP

Practice	LLDP 1977/78 %	LLDP 1978/79 %
Ridging		
OK, no advice	63	65
OK advice	32	35
Not OK, no advice	0	0
Not OK, advice	0	0
Weeding		
OK, no advice	89	52
OK, advice	4	47
Not OK, no advice	7	1
Not OK, advice	0	1
Plant population		
OK, no advice	2	16
OK, advice	-	5
Not OK, no advice	90	70
Not OK, advice	8	9
Total observations (n)	728	504

Source: LADD Evaluation Unit (1980a), table 10.

There is, therefore, reason to have some reservations about the efficacy of the day-to-day work of extension agents. In his review of the literature on the impact of extension services worldwide, Orivel (1981) shows that, according to most studies, extension agents have contact with a small proportion of farmers, and these farmers produce more only in half of the studies. That does not mean that investment in extension services are not cost-effective (rates of return estimates have rather high values), but that extension services have real difficulties in reaching the mass of farmers. We will look next at the costs, both of EAB and of extension staff, in order to see how far they can be compared in cost, and what policy conclusions one might draw about the use of both styles of extension work.

COSTS

The Extension Aids Branch organizes a variety of activities and its own accounts do not attribute expenditure activity by activity. Using their 1980 budget, we have therefore calculated the costs on a number of assumptions which we summarize here, before looking in detail at the costs for each kind of work. All costs are divided between current costs, such as staff salaries, vehicle fuel or paper; and capital costs, such as mobile vans or buildings. In order to work out a total annual cost, we need to add capital costs to recurrent. This is done, using standard cost-accounting methods, by calculating the equivalent of an annual rent on capital assets and adding it to the recurrent costs. (For a fuller discussion of this, see Jamison, Klees, and Wells (1978)).

We have seen that EAB's activities can usefully be considered under four headings: radio, mobile vans, print, and administration and evaluation. It is then possible to allocate the costs of administration and evaluation to the first three of these, and we do this in table 11 below.

Costs have been calculated in Malawi Kwacha, equivalent to US $1.20 in 1980.

The EAB budget does not break staff costs down into departments, although we do have the wages for drivers and puppeteers in the mobile units. Assuming that, otherwise, the distribution of grades of staff is much the same in each section, we can allocate total staff costs to the different sections. The total salary bill is K135 000 for established staff and K12 500 for non-established staff. We have allocated 8% of this to the radio section, 40% to the mobile unit, 32% to print, and 20% to administration and evaluation.

The headquarters building is 13 650 ft^2 (1 288 m^2). At the time of our visit, building costs were K22 per ft^2. We have therefore valued the building at 1980 K300 000 and allocated this cost in the same proportions as we have allocated the staff costs.

We have used three discount rates to amortise capital costs - 0%, 7.5%, and 15% - and have assumed that buildings have a life of 50 years; vehicles, electronic material and cameras, 4 years; furniture and printing equipment, 10 years.

The Cost of radio

EAB's broadcasts are written and produced by their own staff, but are then recorded in the Lilongwe studios of Malawi Broadcasting Corporation (MBC) and broadcast through their network of eight transmitters. We have therefore calculated their costs by taking EAB's costs and adding to them a figure for MBC's transmission costs. MBC had in 1980 calculated that their costs were K840 per hour: this included amortisation of the capital cost of the broadcasting service, staffing and running costs, and notional losses of advertising revenue. It is thus a significantly higher figure than the marginal, or above the line, cost often used in calculating the costs of educational broadcasts. Knowing that EAB broadcasts 232 hours a year, we can now produce broadcasting costs in the form shown in table 10.

The Cost of mobile units

As we have seen there are three major activities involving the mobile vans: the making of films (and at much less cost the development of puppet plays), the showing of films, and the showing of puppet plays. We have included all these costs in Table 11, but then separated the costs for film shows from the costs of puppet plays on the necessarily arbitrary basis that three-quarters of the costs to be charged are for film shows and one-quarter for puppet shows.

We can summarize Table 11 by saying that for a total cost of between K205 000 and 244 000 (US $250 000-300 000), the EAB can run some 12 vans, provide them with films, and show these films to half a million adults a year, while showing puppet plays to three-quarters of a million, and also attracting significant audiences of children. A single mobile van costs between K17 000 and K20 000 a year and can be expected to give some 100 film shows and 300 puppet shows a year.

Table 10: Cost of Radio

Unit: 1980 Kwachas

Recurrent:			
Personnel	12 000		
Sound tapes	600		
Narrators	1 300		
Travel [a]	4 200		
Miscellaneous	500		
MBC broadcasting costs [b]	194 900		
Total recurrent cost	213 500		
Capital:	**0%**	**7.5%**	**15%**
Vehicles [a]	3 470	4 150	5 050
Building	380	1 850	3 603
Recording material [c]	2 000	2 392	2 800
Total capital cost	5 850	8 392	11 453
Total Yearly Cost	219 350	221 892	224 953
Unit Cost:			
Per hour	945	956	970
Per farmer-listener per year [d]	0.731	0.740	0.750
Per farmer-listener per hour	0.0031	0.0032	0.0032

a/ Assuming 1/15 of vehicles cost in EAB.

b/ Assuming 232 hours a year at K840 per hour.

c/ Recording material has a purchase value of K8 000.

d/ We have taken a conservative estimate of the audience of 300 000 persons, or about one person in each of 30% of the total number of farming households in Malawi.

Thus, we can see that for a total cost of some K219 000 - 225 000 (about US $260 000), Malawi can reach at least 300 000 farmers by radio for 4 1/2 hours a week throughout the year. Of this figure, only about K20 000 - 25 000 appears in the budget of EAB.

Table 11: Cost of Mobile Unit

Unit: 1980 Kwachas

Recurrent:	Mobile Units	For Films a/	For Puppets
Personnel	60,000	45,000	15,000
Cine supplies and processing	30,000	30,000	-
Vehicle maintenance	23,300	17,475	5,825
Fuel	35,500	26,625	8,875
Miscellaneous	2,700	2,025	675
Total Recurrent Cost	151,500	121,125	30,375

Capital:	0%	7.5%	15%	0%	7.5%	15%	0%	7.5%	15%
Vehicles	48,530	58,042	70,750	36,400	43,530	53,060	12,130	14,512	17,690
Buildings	2,400	9,249	18,017	1,800	6,937	13,513	600	2,312	4,504
Cameras	2,500	2,990	3,500	2,500	2,990	3,500			
Total Capital Cost	53,430	70,281	92,267	40,700	53,457	70,073	12,730	16,824	22,194
Total Cost	204,930	221,781	243,767	161,825	174,582	191,197	43,105	47,199	52,569

Unit Costs:									
per van b/	17,077	18,482	20,314	13,485	14,848	15,933	3,759	3,933	4,380
per show c/				135	145	159	12	13	15
per adult viewer d/				0.30	0.32	0.35	0.057	0.063	0.070
per viewer				0.18	0.19	0.21	0.029	0.031	0.035
per adult viewer per hour e/				0.12	0.13	0.14	n.a	n.a	n.a

Notes:

a/ Where costs cannot readily be attributed to films or puppets, we have assumed that 3/4 of the costs should be attributed to films and 1/4 to puppets.

b/ These figures are based on the experience of the 12 vans directly controlled by EAB, so the costs are divided by 12.

c/ Assuming each van does 100 cinema shows and 300 puppet plays a year. At 400 plays a year, as more recent information from Malawi suggests, the cost at 7.5% falls to K10 per show.

d/ This is based on an average of 900,000 viewers of films per year, of whom 540,000 are adults, and 1,500,000 watching puppet plays, of whom 750,000 are adults.

e/ For an average film show of 2.5 hours. We have no figures for the average length of puppet shows.

The cost of print

The printed materials produced by EAB are distributed both to farmers and to extension workers, which makes it more difficult to calculate a unit cost. Text books, bulletins, booklets and circulars go mainly to extension agents, but the magazine Achikumbi goes to 2 000 extension staff and to 30 000 farmers. If we assume that half the costs should be attributed to these 30 000 farmers and the other half to the extension services, then we need to add this latter half to the costs of the extension services (see Annex A). The unit cost for each literate farmer is then between K2.00 and K2.40 while the annual expenditure on printing is between K120 000 and 140 000 (US$140 000-170 000). The costs are set out in Table 12.

Table 12: Cost of Print

Unit: 1980 Kwachas

Recurrent:			
Personnel	47 000		
Paper	30 000		
Print	12 000		
Ink, chemicals	10 000		
Stationery	12 000		
Photo	5 000		
Miscellaneous	2 200		
Total Recurrent Cost	118 200		
Less Revenue	12 000		
Net Total Recurrent Cost	106 200		
Capital:	0%	7.5%	15%
Printing machines a/	3 600	5 256	7 164
Building	1 920	7 399	14 413
Total Capital Cost	5 520	12 655	21 577
Total	111 720	118 855	127 777
attributed to:			
30 000 farmers (1/2)	55 860	59 427	63 888
extension staff (1/2)	55 860	59 427	63 888
Unit cost for 30 000 farmers	1.86	1.98	2.13

a/ Replacement cost has been estimated at K12 000 per machine.

The cost of evaluation and administration

The remaining costs are for administration and evaluation and are set out in Table 13.

Table 13: Cost of Administration and Evaluation

Unit: 1980 Kwachas

Recurrent:			
Personnel	29 000		
Miscellaneous	1 400		
Capital:	0%	7.5%	15%
Furniture	3 000	4 380	5 970
Building	1 200	4 624	9 008
Total	34 600	39 404	45 379

If we share these costs between the other activities of EAB, using the same proportions as we did for the staff costs, then we increase the costs for each activity as shown in Table 14. We can then summarise the figures by saying that for a total annual sum, including rent on the capital and a full share of the costs of braodcasting incurred by MBC of between K575 000 and 645 000 (US $680 000 - 775 000), the EAB:

- can reach about 540 000 adults with films and 750 000 with puppet plays;
- can provide 4 ½ hours broadcasting a week which reaches nearly one farmer in three;
- can provide printed support material to some 30 000 literate farmers, and to extension services throughout the country.

Table 14: Costs including Charge for Administration and Evaluation

Unit: 1980 Kwachas

	Rate %	Raw	Addition for Evaluation & Administration [a]	New Total Cost	New Unit Cost
Radio	0	219 350	3 460	222 810	0.0032[b]
	7.5	221 892	3 940	225 832	0.0032
	15	224 953	4 538	229 491	0.0033
Mobile Unit - Total	0	204 930	17 300	222 230	-
	7.5	221 781	19 702	241 482	-
	15	243 767	22 689	266 456	-
Mobile Unit - Films	0	161 825	12 975	174 800	0.129[c]
	7.5	174 582	14 776	189 358	0.140
	15	191 198	17 017	208 215	0.154
Mobile Unit - Puppets	0	43 105	4 325	47 430	0.063[d]
	7.5	47 199	4 926	52 125	0.069
	15	52 569	5 672	58 241	0.078
Print	0	111 720	13 840	125 560	2.09[e]
	7.5	118 855	15 762	134 617	2.24
	15	127 777	18 152	145 929	2.43
Total (all media)	0	536 000	34 600	570 600	
	7.5	562 528	39 404	601 932	
	15	596 497	45 379	641 876	

Notes:

a/ 10% radio, 50% mobile unit, 40% print.

b/ Per farmer per hour.

c/ Per adult per hour.

d/ Per adult member of audience.

e/ Per literate farmer receiving the material.

Comparison with extension services

If we take as an example of cost of extension services in Malawi those of the Lilongwe Agricultural Development Division, which counts 169 field assistants and 40 farm home instructresses, we can compare the costs of EAB activities with those of extension visits, as in Table 15.

Table 15: Cost of extension services in LADD a/

Unit: 1980 Kwachas

Recurrent:			
Personnel	320 000		
Vehicles' operation	72 000		
Building maintenance	27 000		
Miscellaneous	17 400		
Total Recurrent Cost	436 400		
Capital:	0%	7.5%	15%
Building	58 000	221 000	432 000
Vehicles	4 000	4 780	5 600
Total Capital Cost	62 000	225 780	437 600
TOTAL COST	498 400	662 180	874 000
Unit cost (per field agent) b/	2 384	3 168	4 181
Unit cost/with printed material (on the basis of 2 000 agents receiving this material)	2 415	3 202	4 218

Notes:

a/ Detailed explanations of costs appear in Annex B.

b/ There are 209 field agents.

As we have no reliable data on the number of visits paid to farmers by each agent during a year, we have done a cost simulation for the range of 1 hour visits between 50 and 500; and this is shown in table 16. Leonard (1977, p. 32) found that in the, broadly similar, agricultural service in Kenya, extension agents visited 20.3 farmers a month. Assuming the average visit took 1 1/2 hours, this suggests that a figure of between 300 and 400 contact hours would be realistic.

Table 16: Cost of Extension Visits

Unit: 1980 Kwachas

Discount Rate/ No. of Visits	50	75	100	200	300	400	500
0	47	31	24	12	8	6	5
7.5	63	42	32	16	11	8	6
15	84	63	42	21	14	10	8

We can summarise the costs of both EAB and extension services generally, which we do in table 17.

Table 17: Agricultural Information Services: Cost Summary

Unit: US $

Service	Annual Cost		
	Total	Per Farm Family [a]	As % of Total
1. Agricultural Extension [b]	4 970 000	5.230	77.9
2. Farmer Training Centre (Residential) [b]	517 000	0.544	8.1
3. Farmer Training Centre (Day) [b]	270 000	0.284	4.2
4. Radio (EAB)	265 000	0.279	4.2
5. Mobile vans (EAB) Movie	209 000	0.220	3.3
6. Mobile vans (EAB) Puppet	81 000	0.085	1.3
7. Printed material (EAB)	71 000	0.075	1.1
Total	6 383 000	6.719	100.0

Notes:

a/ Assuming 950 000 farmers.

b/ See Table 1 and Annex B.

CONCLUSIONS

EAB is a well established part of the extension service of Malawi. It is no longer an experimental project. Thus, it has a wealth of experience which makes it possible to draw firm conclusions about its work and its significance for agriculture in Malawi. Further research on its effects would be possible and would be assisted by the variety and high quality of the other research work which is going on in the areas of agricultural extension and economics in Malawi. In the meantime, we can regard as robustly established three major conclusions: EAB succeeds in contacting farmers at a very low cost in comparison with orthodox extension methods; it has found that radio is especially cheap; farmers do benefit from EAB's activities.

We have seen that the cost per contact hour is much lower for EAB's films, puppet plays or radio broadcasts than for contact with an extension officer. The audiences for EAB's mobile vans include a significant proportion of women and there is no reason to believe that the poorer farmers are excluded from the audience. We can also assume that there are significant numbers of women who hear their radio programmes, although we do not have figures for these.

If we use a 7.5% interest rate, the costs per contact hour are:

Radio	K0.0032 ($0.00384)
Mobile unit - films	K0.140 ($0.168)
Mobile unit - puppets	K0.069 ($0.0828)
Extension agents	K8-K11 ($9.60-13.20)

Thus, the mobile unit is 44 times as expensive as radio, while extension agents cost 55 to 80 times as much as the mobile unit. Extension services are 2 500 to 3 500 times as expensive as radio.

Despite these dramatic differences in costs, there is evidence that farmers learn from radio and from mobile vans. While (cf. table 8) 67% of farmers may have used their extension agent as a source of information, 27% reported that they used the radio programme. Even if there were severe limits on the amount of information derived from radio programmes, it is impossible to resist the conclusion that the broadcasts were highly cost-effective. The importance attached to radio by farmers parallels findings elsewhere. Yazidu (n.d., pp. 47-8) found in 1971, for example, that nearly half the farmers he surveyed in northern Nigeria regarded radio as the most important source of agricultural information.

It is important to qualify this conclusion. We would <u>not</u> argue for abandoning the use of mobile vans, simply because radio proved cheaper. There are theoretical and practical arguments for using a variety of media, rather than just one. While print, for example, takes a very large proportion of the resources of EAB, the background information it carries about radio programmes and about the activities of mobile vans contributes to their effectiveness.

We believe, too, that there is scope for increasing the effectiveness of all media by EAB. The Branch has suffered from a degree of isolation and it seems that its work could be more tightly related to the work of extension agents in the field. This would entail the development of closer working relationships both at Lilongwe and in the field. We also sensed a degree of separation between EAB and the work of agricultural research.

But the profoundest change which we would suggest to EAB is one of philosophy. As we saw, much of their output consists of direction to the farmers--instruction on what they should do. We were more than once assured that the Malawi farmers no longer needed instruction of this kind-

-if they ever did--and there is now scope for a more sophisticated approach by EAB which is concerned more broadly with the education of farmers and less narrowly with instructing them. For that change to be effective, closer links between EAB's mass media and the work of extension agents, or other ways of grouping farmers together, would be of particular value.

APPENDIX 1: Main print jobs 1978

Title		No. of copies printed
Text books:	Guide to Agric. Production 1978/79	2 500
	A Glossary of Research Management Terms	2 000
	Department of Extension and Training 1973 Annual Report	500
	The Livestock Husbandry Techniques	2 500
Bulletins:	National Rural Development Programmes	4 500
	Extension Aids Branch 1958-1978	5 000
	Research Bulletin No. 2/72	3 000
Booklets:	Tea Farmers Guide and Calendar	600
	Malangizo kwa Oyang'anira Nkhalango	8 000
	Shire Valley Agricultural Dev. Project	1 000
	Colby College of Agriculture	200
	Radio and Mobile Unit Programmes	1 100
	Birds at Lilongwe Nature Sanctuary	1 000
	Extension Aids Branch Work Calendar	50
Magazine:	Za "Achikumbi" magazine (6 issues)	96 000
	Inserts for "The Fields" Magazine	64 000
Posters:	Art competition for Environmental Educ. Unit	250
	"Bzalani Mitengo" for L.L.D.P.	500
	"Mitengo ndi chuma" for L.L.D.P.	500
	Reprint of Flannelgraph pictures	1 000
	Cards and Certificates	24 000
	Agricultural show kits	110
Circulars:	Grow More Cassava	3 000
	Growing Wheat in Malawi	3 000
	Strawberries (Revised Edition)	3 000
	Citrus (Revised Edition)	3 000
	Soya Bean Recommendation	3 000
	Interim Research Recommendation for Oriental Tobacco	2 000
	Prevent Tick Diseases by Improved Dipping	3 500
	Handouts and leaflets	151 000
	Forms in general	300 226
	Other (Maps, covers, lettering, etc.)	942 422

Source: EAB Annual Report 1978.

APPENDIX 2: Mobile vans schedule - northern region 1990

PROGRAM NUMBER	SUBJECT MATTER	DATE	VEHICLE LOCATION BY DATE VEHICLE 1	VEHICLE 2	VEHICLE 3	VEHICLE 4
1	Oriental tobacco harvesting, curing and uprooting stalks (Mzimba and Rumphi West).	March 10th-14th	Mzimba North	Kasitu/ Perekesi	Chitipa South	Karonga South
	Cotton spraying (Henga Valley). Cotton weeding and spraying (Karonga).	March 17th-21st	Rumphi West	Ruthini	Chitipa Central	Karonga Central
	Rice weeding, fertiliser application and birds scaring (Karonga).	March 24th-28th	Henga Valley	Bulala	Chitipa North	Kaporo South
2	Maize stocking and harvesting. Groundnuts harvesting.	April 14th-18th	Nkhata Bay South/ Limphasa Scheme	Ruthini	Chitipa South	Karonga South
	Birds Scaring and harvesting rice (Nkhata Bay and Karonga).	April 21st-25th	Nkhata Bay North	Mzimba South West	Chitipa Central	Karonga Central
	Coffee weeding, fertiliser application and pests and diseases control (Khata Bay North, Phola Hills, Misuku Hills and Viphya North).	April 28th-May 2nd	Viphya North	Mzimba South East	Chitipa North	Kaporo North
	Cotton picking and grading (Henga Valley). Cotton spraying (Karonga).	May 5th-9th	Phoka Hills	Mzimba South	Misuku Hills	Kaporo South
	Oriental tobacco curing and, uprooting and burning stalks (Rumphi West and Mzimba).					
3	Oriental tobacco grading and Marketing (Rumphi West and Mzimba).	May 19th-23rd	Henga Valley	Mzimba Central	Chitipa South	Karonga Central
	Maize harvesting, storing and marketing. Groundnuts shelling, grading and marketing.	May 26th-30th	Rumphi West	Kasitu/ Perekesi	Chitipa Central	Kaporo South
	Cotton grading, marketing and stalks uprooting (Henga Valley). Cotton picking, grading and stalks uprooting (Karonga).	June 2nd-6th	Mzimba North	Bulala	Chitipa North	Karonga South
4	Livestock management. On-training. Fertiliser and improved seed buying. Credit recovery.	June 23rd-27th	Phoka Hills	Viphya North	Misuku Hills	Kaporo North
	Coffee nursery preparation and sowing. Cotton stalks uprooting and burning (Henga Valley).	June 30th-July 4th	Henga Valley	Nkhata Bay North	Chitipa North	Karonga Central
	Cotton picking, grading and stalks uprooting (Karonga).					
5	Winter Rice weeding and fertiliser application (Karonga and Nkhata Bay).	Aug. 11th-15th	Nkhata Bay South/ Limphasa	Ruthini	Chitipa South	Karonga South
	Coffee harvesting, grading and selling. Coffee tonic spraying.	Aug. 18th-22nd	Nkhata Bay North	Bulala	Chitipa Central	Karonga Central
	Cotton stalks uprooting and burning, cotton grading and marketing (Karonga).	Aug. 25th-29th	Phoka Hills	Kasitu/ Perekesi	Misuku Hills	Kaporo South
	Garden preparation. Livestock management. Credit recovery.					
	Cashew nuts - nursery preparation and sowing (Lakeshore).					
6	Garden preparation Manure application. Dangers of Viceso. Livestock management.	Sept. 15th-19th	Nkhata Bay South/ Limphasa	Viphya North	Chitipa South	Kaporo North
	Rice nursery preparation and sowing (Karonga and Nkhata Bay).	Sept. 22nd-24th	Nkhata Bay North	Mzimba North	Misuku Hills	Kaporo South
	Coffee pruning, digging and filling coffee planting holes (Phoka Hills, Misuku Hills, Nkhata Bay North and Viphya North).	Sept. 29th-Oct.3rd	Phoka Hills	Mzimba Central	Chitipa North	Karonga South
	Cashew nuts nursery preparation and seed sowing (Karonga and Nkhata Bay).					
7	Maize and groundnuts planting, weeding and fertiliser application.	Oct. 20th-24th	Nkhata Bay South/ Limphasa	Mzimba South	Chitipa South	karonga South
	Oriental tobacco nursery preparation and seed sowing (Rumphi West and Mzimba).	Oct. 27th-31st	Henga Valley	Mzimba South East	Misuku Hills	Karonga Central
	Winter rice harvesting, summer rice garden preparation (Karonga and Nkhata Bay.	Nov. 3rd - 7th	Rumphi West	Mzimba South East	Chitipa Central	Kaporo North and South
	Cotton planting and weeding (Henga Valley).					

APPENDIX 3: Sources of agricultural information for farmers

Study	Sample Total	Sex(%) M	F	No. Sch.	Education (%) Std. 1-3	Std. 4-5	Std. 6-8	Oth.	Literacy (%) reads well	with diff.	not at all	Source of agricultural information (%) Ext. wkr.	Radio	Films	Puppets	ZA	Course	Other
Michiru mountain park campaign KAP study (a)	260	41	59	31	17	18	23	13	29	16	54	33	54	4	0	0	11	-
Forestry campaign: KAP study, LLDP	229	76	24	52	-	40	-	8	0	N/A		40	22	-	-	-	5	33
Forestry campaign: leaflets pre-test, LLDP	309	49	51	60	25	9	6	0	16	17	67	79	6	-	5	-	11	15
Crop storage campaign: radio pre-test, SVACP	166	64	36	38	45	10	5	1	N/A			64	-	16	1	1	1	-
Radio survey: Balaka (b)	166	71	28	49	-	36	-	14	0	N/A		(43)	(36)	(12)	(2)	(1)	(8)	(11)
Radio survey: LRDP (b)	162	68	32	52	-	40	-	7	1	N/A		(51)	(18)	(20)	(4)	(0)	(1)	(2)
Radio study: Karonga	56	71	29	41	38	7	14	0	N/A			89	29	23	4	2	7	18
Film pre-test: Manyamula (c)	172 (100)	(73)	(27)	(15)	(21)	(15)	(46)	(2)	N/A			74	26	25	6	6	12	17
Training exercise: Nambumba	151	56	44	42	15	19	20	1	26	28	45	83	32	3	1	5	9	22

Source: EAR Unit, 1980

Notes

(a) sample included an urban area (Chilomoni)

ZA = Za Achikumbi

(b) % in brackets refer only to information about early garden preparation

(c) % in brackets refer to sub-sample only; i.e. those who were interviewed both before and after the films

ANNEX A

EXTENSION, EDUCATION AND FARMERS' PRODUCTIVITY IN MALAWI

This paper examines the functioning, costs, and outreach of the Extension Aids Branch of the Ministry of Agriculture; it does not, however, assess the ultimate impact of EAB's activities on productivity. Unfortunately, data that would allow such an assessment are not available. To form some idea about EAB's potential impact and to reach a better sense of the efficacy of the extension service, we have, however, analysed available data. This Annex reports the results of that analysis. It begins by describing the data we use. It then analyses separately, for each of two samples, the relations between farmers' characteristics and their exposure to extension; then the relations between extension and education on the one hand, and crop adoption and productivity on the other, are analysed. Finally, we examine two key questions: are educated and/or visited farmers wealthier, and are non-traditional crops grown at the expense of subsistence crops?

Data

The data analysed in this Annex were collected by the Ministry of Agriculture's Agro-Economic Survey in 1979 and give information on the 1978 crop. Data on two samples of 150 farmers were randomly selected (by geographical region from the larger data sets). These farmers are smallholders. The majority of them are growing maize. In the first sample, a minority of farmers is growing groundnuts and/or cotton, and in the second one, ground-nuts and/or tobacco. For each farmer, we know the size of the household, the holding size, the number of years of education of the head of the household, the size of land cultivated for each crop, the output of each crop, and the number of visits of extension agents for each crop. Table A1 below provides information on the characteristics of the farmers in the two samples.

Table A1: Main Characteristics of Farmers

	Sample 1		Sample 2	
	Mean	Standard Deviation	Mean	Standard Deviation
Holding size 1/	134	84	134	76
Household size	4.15	2.16	4.45	1.84
Education 2/	0.54	0.82	0.94	0.96
Maize plot 1/	90	0.56	87	48
Maize crop 3/	1 238	1 100	1 072	928
Groundnuts plot 1/	10	8.3	31	28
Groundnuts crop 3/	46	37	172	159
Cotton plot 1/	63	41	-	-
Cotton crop 3/	582	481	-	-
Tobacco plot 1/	-	-	35	21
Tobacco crop 3/	-	-	292	264
Extension (No. of visited farmers	22		15	
(No. of visits	34		25	
Regions	6 (25 farmers in each)		6 (25 farmers in each)	

1/ In hundredths of ha. The national average is 166.
2/ Number of years of education.
3/ In kilos.

I. SAMPLE I

A. Extension, Education and Choice of Crop

- Extension and Education

Table A2: Extension and Education 1/

Unit: No. of farmers

	Extension = 0		Extension > 0		Total	
	No.	%	No.	%	No.	%
Education = 0	85	89	11	11	96	64
Education > 0	43	80	11	20	54	36
Total	128	100	22	100	150	100

1/ Education is measured by the number of years of education. Extension is measured by the number of visits of extension agents to the farmer. Both education and extension are considered as > 0 when the number of years or visits is 1 or more.

15% of the farmers have been visited by an extension agent at least once. 36% of the farmers have one or more years of education; in practice, it is never more than 3 years, and usually only one or two. The educated farmers are twice as likely to be visited by an extension agent as those who are uneducated (20% against 11%).

- Education and Non-traditional Crops

Subsistence agriculture is characterised by the production of maize, the main source of food for a farmer's family. Farmers who produce groundnuts have usually two objectives: a diversification of the family diet, and the marketing of part of the crop for cash. We can therefore regard the cultivation of crops other than maize as evidence of innovative behaviour. Farmers who produce tobacco or cotton have a market objective. We have looked at whether innovative behaviour is positively connected with education and/or extension.

Table A3: Education, Groundnuts and Cotton

Unit: No. of farmers

		Education					
		---Yes---		----No---		--Total--	
		No.	%	No.	%	No.	%
Grow groundnuts	Yes	8	15	8	8	16	11
	No	46	85	88	92	134	89
	Total	54	100	96	100	150	100
Grow cotton	Yes	25	46	25	26	50	33
	No	29	54	71	74	100	67
	Total	54	100	96	100	150	100
Grow groundnuts and cotton	Yes	6	11	2	2	8	5
	No	48	89	94	98	142	95
	Total	54	100	96	100	150	100

11% of the farmers grow groundnuts, but this proportion reaches 15% among educated farmers and 8% among uneducated farmers (the probability is 2/3 higher). 33% of the farmers grow cotton, but here again, the educated farmer is twice as likely to grow cotton. Only 5% of the farmers grow both cotton and groundnuts, but the educated farmers are 6 times more likely to do so than are the uneducated.

- Extension and Non-traditional Crops

Table A4: Extension, Groundnuts and Cotton

Unit: No. of farmers

		Extension					
		---Yes---		-----No---		--Total--	
		No.	%	No.	%	No.	%
Grow groundnuts	Yes	5	23	11	9	16	12
	No	17	77	117	91	134	88
	Total	22	100	128	100	150	100
Grow cotton	Yes	22	100	28	22	50	33
	No	0	0	100	78	100	67
	Total	22	100	128	100	150	100
Grow groundnuts and cotton	Yes	5	23	3	2	8	5
	No	17	77	125	98	142	95
	Total	22	100	128	100	150	100

23% of the farmers who have been visited by extension agents grow groundnuts, but only 9% of those not visited do so. All the farmers who have seen an extension agent grow cotton, whereas only 28% of the others do. Finally, 23% of the visited farmers grow both groundnuts and cotton, and only 2.3% (ten times less) of the non-visited do.

On the whole, educated farmers grow non-traditional crops almost twice as often as non-educated farmers; farmers visited by extension agents cultivate non-traditional crops four times as often as non-visited farmers; and educated farmers are twice as likely to be visited by an extension agent as uneducated farmers. Although education is less efficient than extension in generating innovative behaviour among farmers, it has, in addition to a direct effect, the indirect effect of increasing the probability of meeting extension agents. The effect of education is more likely a causal one for extension, where, particularly given extension agents' instructions on whom to visit, it is plausible that much of the association between innovative behaviour and extension contacts results from the agents choosing to visit the better farmers.

B. Production Function of Maize

Given the absence of a good labour indicator, we could not examine substitution effects between land and labour, and in this case, the output tends to be linearly related to the size of the plot. For this reason, we have run linear regression, and not Cobb-Douglas functions (using the log of the variables).

Table A5: Determinants of Maize Production

Variable	Regression Coefficient	t
Land	14.02	11.75*
Education	-5.8	0.07
H/H size	36.2	1.15
Extension	313.2	3.45*
Region 2 1/	-91.1	0.42
Region 3	421.2	1.97*
Region 4	-153.3	0.63
Region 5	658.5	2.70*
Region 6	241.8	1.10
Constant	-390.0	
R^2	0.60	

1/ Each region is compared to region 1 which was taken as reference and deleted from the regression.

* Significant at 5% level or better.

Land: Land is, of course, by far the most significant variable in explaining maize production. On average, each hundredth of ha increases the production by 14 kg.

Household size: Has a positive but not significant effect, although it is close to significance. This variable could have been considered as a proxy for labour.

Region: Two regions have a highly significant advantage over the others (421 and 658 more kg). This variable can be considered as a proxy for environment (quality of soil, irrigation and water availability, climate).

Extension: According to this regression, each visit of extension agents increases the production by 313 kg, in an undoubtedly significant way. The yearly benefit of a visit is then approximately K60 (for a K0.2 per kg price of maize), which we can compare with the cost of a visit: between K5 and K60 (see EAB Cost Study). But as we have seen above, this may simply be the result of the bias of extension agents in visiting the better farmers.

Education: Education has an indirect effect rather than a direct one: it increases the probability of meeting extension agents (which may increase the productivity), and it increases the probability of growing crops. In this sample, the number of years of education is low (between 1 and 3 years, never more). This suggests that, to have a direct effect, education needs to be more than 1-3 years, perhaps a minimum of 4-5 years.

II. SAMPLE II

A. Extension, Education and Choice of Crop

Table A6 shows the relations, in sample II, between multiple crop choice and farmers' education and extension exposure.

Table A6: Extension, Education, and Number of Farmers Cropping Groundnuts and/or Tobacco

Unit: No. of farmers

		Extension						Education					
		No		Yes		Total		No		Yes		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Grow ground-nuts	Yes	88	65	11	79	99	66	37	57	62	73	99	66
	No	48	35	3	21	51	34	28	43	23	27	51	34
	Total	136	100	14	100	150	100	65	100	85	100	150	100
Grow tobacco	Yes	37	27	8	57	45	30	16	25	29	34	45	30
	No	99	73	6	43	105	70	49	75	56	66	105	70
	Total	136	100	14	100	150	100	65	100	85	100	150	100
Grow ground-nuts and tobacco	Yes	25	18	7	50	32	21	10	15	22	26	32	21
	No	111	82	7	50	118	79	55	85	63	74	118	79
	Total	136	100	14	100	150	100	65	100	85	100	150	100

Extension: Less than 10% of the farmers have been visited by extension agents. Nevertheless, those who have been visited tend to grow groundnuts slightly more often (79% versus 65%), to grow tobacco twice as often (57% versus 27%), to grow both groundnuts and tobacco three times as often (50% versus 18%).

Education: A relatively high proportion of the farmers, 57%, have received some education (between 1 and 3 years). Educated farmers grow groundnuts more often (73%) than the uneducated (57%). Likewise, they grow tobacco (34% versus 24%), and both crops more often (26% versus 15%). The probability for the educated and visited farmers to grow non-traditional crops is higher, as in sample I, but the gap is slightly smaller in this case. But in comparison with sample I, the proportion of educated farmers is much higher, and so is the proportion of farmers growing groundnuts. The lower effect of education can only be the consequence of the law of decreasing returns, or statistically speaking, the fact that the curve of farmers growing groundnuts is asymptotically reaching the ceiling of 100%.

B. Extension and Education

Table A7: Extension and Education

Unit: No. of farmers

	Extension = 0		Extension > 0		Total	
	No.	%	No.	%	No.	%
Education = 0	62	46	3	21	65	43
Education > 0	74	54	11	79	85	57
Total	136	100	14	100	150	100

Although the number of farmers visited by extension agents is low in this sample, educated farmers have a substantial advantage since 12.9% of them are actually visited, compared to 4.6% for the uneducated.

C. Production Function for Maize

We have run the same kind of regression used for sample I, with the same independent variables.

Table A8: Determinants of Maize Production

Variable	Regression Coefficient	t
Land	11.7	8.94*
Education	21.2	0.35
H/H Size	49.7	1.41
Extension	217.4	1.81
Region 2	325.1	1.66
Region 3	1047.3	5.65*
Region 4	401.6	2.13*
Region 5	433.6	2.14*
Region 6	422.7	2.06*
Constant	-648	
R^2	0.54	

* Significant at 5% level or better.

The results are very similar to those of sample I. The significance of extension is slightly lower, but we must remember that few farmers were visited in that sample. Regions 2, 4, 5, and 6 have the same pattern. Region 1 produces significantly less than this group, and region 3 significantly more.

D. Production Function for Groundnuts

Table A9: Determinants of Groundnuts Production

Variable	Regression Coefficient	t
Land	4.7	9.10*
Education	-3.9	0.17
Extension	50.5	0.66
H/H Size	-0.24	1.25
Region 2	124.4	3.27*
Region 3	179.3	5.03*
Region 4	74.2	1.94*
Region 5	59.8	1.52
Region 6	143.2	3.70*
Constant	-38.5	
R^2	0.61	

* Significant at 5% or better.

Here again, the most statistically significant variables are the size of the land cultivated for this specific crop and the regions (here, all are more productive than region 1). The R^2 is in the same range as in the first 2 regressions (0.61).

Education has a negative but not significant effect, and extension has a strongly positive but not significant effect. Extension, in this sample, is scarce, and there are not enough observations to generate statistically significant effects.

III. SPECIFIC QUESTIONS

A. Are educated and/or visited farmers wealthier?

Table A10 below indicates to what extent the educated and visited farmers have a holding size above the average (two samples together).

Table A10: Education, Extension, Holding Size

Unit: No. of farmers

	Holding Size 1/		
	< 1.34 ha	> 1.34 ha	Total
Education = 0	111	50	161
Education > 0	71	68	139
Total	182	118	300
Extension = 0	174	90	264
Extension > 0	8	28	36
Total	182	118	300

1/ 1.34 ha is the average holding size in both samples.

51.1% of the educated farmers are below the average size and 48.9 above, but 68.9% of the uneducated are below. We can conclude that educated farmers are slightly better off, but we would qualify this difference as small.

The difference is much greater among farmers exposed or not exposed to extension services. 77.8% of the farmers visited by extension agents belong to the group above average. Only 4.4% of the farmers belonging to the group below average have been visited, versus 23.7% of the others.

Extension services are obviously more discriminatory than education services, and as we have seen earlier, the probability of visits increases with education. Therefore, we can conclude that, in this context, education has a positive effect in reducing inequalities. It is also possible that the positive effect of extension agents visits on productivity is simply due to the fact that visited farmers are on average "better", and would have produced more, even without visits. Nevertheless, it remains true that education is not linked with wealth, and that it increases the probability of growing non-traditional crops and the probability of meeting extension agents, and therefore, of increasing

maize production.

B. Are non-traditional crops grown at the expense of subsistence crops?

It has often been observed that cash crops are developed at the expense of subsistence crops and can have negative food and nutritional effects on farmers' families.

The data below do not support this view. On the contrary, the production of maize is constantly increasing when the farmer adds non-traditional crops, and reaches a maximum level when he grows everything. Nevertheless, the holding size follows the same pattern; it is lower among farmers growing only maize and larger among farmers growing non-traditional crops. But the maize plot is more or less similar in the four groups of farmers.

Table A11: Maize Production of Different Groups of Farmers

	No. of Farmers	Av. Crop of Maize	Average H. Size (Total)	Average H. Size Maize Plot	Yield per ha (in kg)
Grow Maize alone	126	1 025	1.02	0.82	1 250
Maize + Groundnuts	109	1 318	1.63	0.67	1 970
Maize + Cotton/ Tobacco	91	1 456	1.77	0.83	1 750
Maize + G-nuts + Cot./Tobac.	40	1 905	1.99	0.94	2 026

ANNEX B

EXPENDITURE AND COSTS FOR AGRICULTURAL EXTENSION AND FARMER CENTRES

Table B1 provides a cost estimate of agricultural extension in a specific project, the Lilongwe Agricultural Development Division. We have calculated the unit cost of an extension agent in this project, and extrapolated this unit cost to the 1 388 field assistants working in the country. We have then allocated half the cost of the print division, in EAB, to the extension services. We have also allocated 100 of the 1 388 field assistants to the implementation of the day centres and of the residential centres.

Table B1: Costs of Agricultural Extension
(From Lilongwe Agricultural Development Division)

Unit: 1980 Kwachas

Estimated costs of supporting 169 field assistants and 40 farm home instructresses on the ground (1980/81):

1.	Operating Costs:				
	(i) Personal Emoluments (of which field assts. & FHIs are K148,350)	K320,000			
	(ii) Vehicle operations (of which bicycle allowances K6,960)	K 72,000			
	(iii) Building maintenance	K 27,000			
	(iv) Miscellaneous	K 17,400			
	Total	K436,400			
2.	Capital Costs:		0%	7.5%	15%
	(a) Vehicle replacement and minor equipment		4,000	4,780	5,600
	(b) Building costs:				
	(i) Housing for field assistants and FHIs: 209 dwellings @ K7,000 = K1,463,000				
	(ii) Housing for area and unit supervisors: 46 DH8 or DH6 @ K22,100 = K1,016,000				
	(iii) Housing for project supervisor (CTO): 1 CH10 @ K29,300				
	(iv) Office buildings: 40 @ K9,000 = K360,000				
	Total building costs = K2,868,000				
	Annualized cost, assuming 50-year building life		58,000	221,000	432,000
	TOTAL ANNUAL COST		498,400	662,180	874,000
	TOTAL ANNUAL COST, per field worker (169 field assistants plus 40 FHIs = 209 total)		2,384	3,168	4,181

Table B2: Total Cost of Extension Services

	0%	7.5%	15%
Unit cost of extension agent x 1288	3 506 000	4 080 000	5 385 000
Cost of EAB printed division x 1/2	55 860	59 430	63 900
Total	3 561 860	4 139 430	5 448 900

Number of Visits to Farmers

There are two categories of extension coverage in Malawi: projects like the Lilongwe Agricultural Development Division which have "intensive" extension activities, and the standard low level of coverage, as in the two random samples analysed in Annex A, where 11% of farmers have been visited in average one and a half times.

We have estimated that 15% of farmers benefit from an intensive coverage and 85% a non-intensive coverage.

If we take a total number of 950 000 farmers,

[85% x 950 000] x 11% x 1.5 visits = 133 000 visits
[15% x 950 000] x 50% x 1.5 visits = 107 000 visits

(considering that 50% of the farmers in regions with intensive coverage are visited).

The total number of contacts is then approximately 240 000, for 1 288 field agents who make around 185 contacts a year.

Table B3 provides a cost estimate of both residential and day centres.

Table B3: Cost of Farmers Centres
(day and residential)

	0%	7.5%	15%
1. Residential			
- Recurrent (miscellaneous): K1.15 per student day x 100 days x 30 students = 3 450 x 30 centres = 103 500			
- Personnel (30 full-time extension agents equiv.)	71 520	95 040	125 430
- Capital (30 centres at K100 000 each, amortised over 50 years)	60 000	231 000	450 000
Total Residential	235 020	429 540	678 930
2. Day Centres[1/]			
- Recurrent (miscellaneous): 70 000 persons/day x 0.24 = 16 800			
- Personnel (70 full-time extension agents equiv.)	166 880	221 760	292 670
Total	183 680	238 560	309 470

1/ The opportunity cost of building was estimated at 0.

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PART IV

TRAINING FARMERS BY CORRESPONDENCE IN CAMEROON

Janet Jenkins
Hilary Perraton

Table of Contents

	page
Acknowledgements	205
Abbreviations	205
Currency	205
SUMMARY	206
1. *INADES-Formation*	208
The aims of *INADES-Formation*	208
A general description of the work of *INADES-Formation*	208
The organisation of the central office	209
2. *INADES-Formation* in Cameroon	211
Beginnings	211
Why several offices?	211
The regional offices	213
3. Correspondence studies	215
The correspondence courses	215
Method of study	216
The students	217
The administration of the course	219
Other support of correspondence studies	220
What do students expect to gain?	222
4. Results	223
The students	223
The effectiveness of the course	224
Alternative sources of information	229
5. Costs	230
What are the costs?	232
6. Conclusions	239
Appendix 1 : The activities of *INADES-Formation*	241
2 : *INADES-Formation*'s national offices	244
3 : *INADES-Formation* booklet titles	245
4 : The costs of *INADES-Formation* in Rwanda	246
REFERENCES	248

ACKNOWLEDGEMENTS

We are indebted to:

Unesco, who provided grants which made the carrying out and publication of this case study possible.

INADES-Formation, and its staff and friends in both Cameroon and the Ivory Coast, who were generous with their time, their hospitality, and their information.

The farmers of Cameroon who made us welcome, plied us with palm wine, and told us about *INADES-Formation*.

Dean Jamison, François Orivel, and colleagues at IEC for support in doing the study and comments on it in draft.

The responsibility for conclusions, interpretation, and any errors rests, of course, with us.

* * * * * *

The greater part of this report is by Janet Jenkins, but Section 5 and Appendix 4 are by Hilary Perraton.

ABBREVIATIONS

CFA	-	French Community in Africa (Communauté Français Africain)
FONADER	-	National Fund for Rural Development
GCE	-	General Certificate of Education
INADES	-	African Institute for Economic and Social Development (Institut africain pour le développement économique et social)
SODECOTON	-	Society for the Development of Cotton
SODENKAM	-	Society for the Development of the Nkam region

CURRENCY

CFA Francs are used in both Cameroon and the Ivory Coast. At the time of writing their value was 214 to US $1.00.

SUMMARY

This paper describes the work of *INADES-Formation*, an organisation founded by Jesuits in West Africa to promote African development. It provides correspondence courses on agriculture for peasant farmers and agricultural extension agents, publishes a magazine on agriculture, and runs seminars. The work of *INADES-Formation* is divided between a central office in the Ivory Coast and national offices in ten African countries.

Cameroon has had a national office for *INADES-Formation* since 1968 and now has four separate regional offices, in order to meet the needs of its scattered agricultural population. Between four hundred and six hundred people enrol on *INADES-Formation* correspondence courses in Cameroon each year. Its office in Yaoundé also contributes to government broadcasting on agriculture.

The *INADES-Formation* correspondence course takes about five years to complete. The first three years, prepared in the Ivory Coast, are on 'general agriculture and animal husbandry', 'the farmer's products', and 'the farmer's trade'. A fourth course, prepared in Cameroon, discusses in greater depth themes of the third course, while the final course is on 'agricultural extension and rural economy' and designed for agricultural extension agents. The courses are divided into booklets, of thirty to sixty pages of simple English or French, and intended to be studied in one month each. Farmers following the courses also complete written assignments which they send to the appropriate regional office of *INADES-Formation* for marking. Students study either in groups or individually but *INADES-Formation* has had only limited success in encouraging and organising group study of the correspondence booklets. Seminars, organised and taught mainly by *INADES-Formation* staff, are, however, used to support correspondence study, and for agricultural education more generally.

Students following the *INADES-Formation* courses do not receive any formal qualification as a result, but are given a certificate of completion at the end of the second and fourth years. They pay a nominal fee for their courses. In at least one area, agricultural extension agents are promoted as a result of completing courses. Farmers who complete the first two years of an *INADES-Formation* course are eligible for Cameroon government credit loans.

Statistics suggest that between 40 and 45% of the students are farmers and a similar proportion are extension agents. With only about 500 enrolments a year, however, *INADES-Formation* is reaching an extremely small proportion of the farming population. It does not in practice recruit many non-literate farmers, farmers who cannot study in French or English, or women. Of those students who do enrol, a relatively high proportion complete their first year of study. Subjective impressions, and discussions with farmers, are consistent in suggesting that farmers learn from *INADES-Formation* courses both better farming practices and the reasons for them. Two limited but more rigorous studies found some evidence of changes in farming practice, where local circumstances permitted or encouraged this, and of gains in knowledge about farming from those who follow the *INADES-Formation* courses.

A study of *INADES-Formation* costs shows that the annual cost per correspondence student in Cameroon was (in 1979 US $$) $224 and that the cost function was:

$$TC = AC(N) + F$$

$$\$128\,462 = 97.16(573) + 72\,791$$

The cost per participant for one day's attendance at a seminar is $59. A comparison with the costs of *INADES-Formation* in Rwanda showed that the cost per correspondence student there was $92, thus suggesting that there might be potential but unrealised economies of scale in Cameroon.

The report concludes by arguing that:

- *INADES-Formation* is, as far as the evidence goes, effective in teaching farmers and extension agents;
- it appears to be reaching some of the poorer farmers but not the poorest;
- the future development of *INADES-Formation*'s work depends on the relationship between it, as a voluntary organisation, and the state;
- there is some uncertainty about the extent to which *INADES-Formation* does, or should, concentrate on educating farmers or extension agents;
- *INADES-Formation* has been concerned with high quality of education, using both correspondence courses and seminars, and has not sought to maximise its enrolment;
- as a result its costs are relatively high, especially when compared, for example, with those of radio schools in Latin America. Nevertheless it may be cheaper than conventional alternatives and may be highly cost effective for teaching extension agents.

1 : INADES-FORMATION

The central office of INADES is in Abidjan on the Ivory Coast. The organisation was founded by a community of Jesuits with a concern to promote African development. *INADES-Formation* is the training division of INADES, and since 1977 has been formally constituted as an international non-profit-making association. In 1962 it launched a correspondence course for extension agents in economics, sociology, planning and development. But it was concerned also to reach farmers directly. *INADES-Formation* felt that there was a need to provide training for farmers which would not remove them from the villages. In 1965 it commissioned a correspondence course about agriculture. Fifteen years later the course still attracts students in their thousands each year. It has grown and changed, with an entirely new edition introduced in 1974. At the same time *INADES-Formation* has developed other kinds of work. This includes various attempts to provide some sort of education for women, who are by and large excluded from following the correspondence course through illiteracy. The latest venture is a correspondence course to train community development workers of both sexes, 'Rural Community Development' (*Animation Rurale*) at present being tested and due for publication in mid-1981. *INADES-Formation* has also developed a system of seminars which are run by its staff, mostly at the request of local organisations or villages. The topics of these seminars are usually determined by the people who request them. Since 1973 *INADES-Formation* has also published a quarterly journal *Agripromo*, which is intended for extension agents and other development workers.

The aims of *INADES-Formation*

INADES-Formation defines its aims as follows:

> 'The general aim of the association is to work towards the social and economic development of people, while giving particular importance to their free and responsible participation in the transformation of their society.
>
> The association commits itself to working in a spirit of service, collaborating with all institutions, officials and individuals pursuing common ends, while respecting the law and policies of the states where it is active.
>
> The association has for its specific objectives:
> (a) training activities on the African continent, priority being given to rural populations;
> (b) socio-economic studies on development in Africa, as well as all operations which help realise social objectives thus defined.'

(statutes of *INADES-Formation*, article 3, 1975, our translation)

INADES-Formation therefore considers it must work both with farmers and with agents of rural development. 'The institute tries, as part of its training, to put peasant farmers and development agents in touch with each other and to help them to establish a dialogue to provide better mutual understanding and greater effectiveness' (INADES, 1979, p.5, our translation).

A general description of the work of *INADES-Formation*

Today *INADES-Formation*'s training takes three main forms: correspondence courses, seminars and the journal *Agripromo*. Appendix 1 describes these in more detail. The correspondence courses and *Agripromo* are written, edited and printed at the central office in Abidjan, but the training centres are the ten national offices of *INADES-Formation*. A list of these offices is

given in Appendix 2. The offices enrol students, distribute courses, sell the journals and organise seminars. In some cases they produce some correspondence course material themselves, particularly where translation into local languages is required. They also help in the development of new or revised course material and its testing and they contribute items for *Agripromo*. Contact between the central office and national offices is maintained by means of monthly reports submitted by each office and then circulated from the centre to all the others; by an annual report which summarises the activities of all offices; by visits from the centre to national offices and from one national office to another; and by a biennial conference of all *INADES-Formation* offices. At this conference, progress over the preceding two years is evaluated and future policy discussed and formulated. Relations with government and with other development agencies in specific countries are generally left to the national offices.

The organisation of the central office

As the number of national offices has increased, the central office has gradually become a service and advisory office for the branches. It operates with a modest staff, the largest departments being those concerned with course and journal production. Figure 1 shows the staffing of the central office in November 1980.

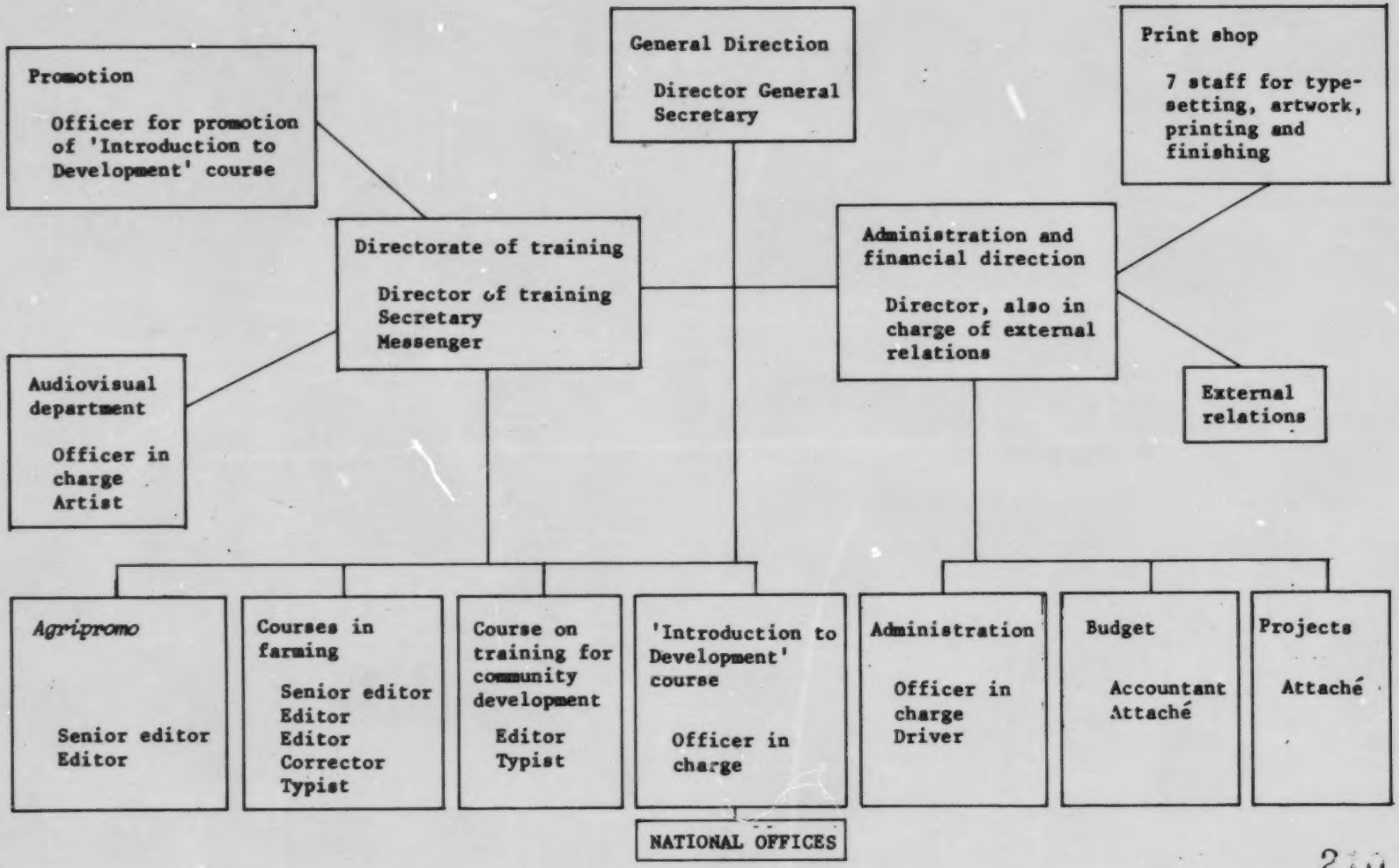
Of the 31 staff, five people in the training department are responsible for planning and carrying out revisions of the farming correspondence course, in consultation with the director of training. The course was originally written by agriculturalists. Now, agriculturalists in each of the national offices contribute suggestions for revisions as these become due. Booklets in draft form are then circulated to national offices, and comments used to finalise the versions. *INADES-Formation* aims to revise the materials every two years. In practice, revised booklets are published less frequently, but most have been recently revised (see Appendix 3). The dates given against each title are those of the latest edition, as of November 1980.

The present version of the course is the result of a complete reshaping of the original which took place in 1974. The editorial team is currently reconsidering the objectives and structure of the course, with a view to further major revisions; at the same time they are continuing with routine revisions.

On the administrative side, work for the farming course includes the allocation of funds to national offices, keeping the accounts from data submitted from the offices, printing of course material, and the despatch of course material as ordered from the offices.

In section 5 we shall see that about half the work of the headquarters is concerned with correspondence coures; most but not all of this concerns the course for farmers.

Figure 1 : Staffing of *INADES-Formation* central office, November 1980



2 : INADES-FORMATION IN CAMEROON

Beginnings

Cameroon was the first country to have an *INADES-Formation* national office. Before it was established all correspondence students, wherever they were, enrolled with the headquarters in Abidjan. In 1968 a French Jesuit working in Cameroon attended a seminar in Douala run by *INADES-Formation* headquarters. He was interested in the work and agreed to establish a local office, which he opened in 1969 in Douala, with a secretary to assist him. He started organising small seminars for farmers which met local needs. These replaced occasional national seminars for people from all parts of the country, run by staff visiting from the Ivory Coast. He has also modified the correspondence courses. He devotes a lot of time to investigating the particular training needs of local farmers and adapting the course material. He has produced a fourth-year course for farmers to supplement the three-year course produced in Abidjan. He has also developed the course for agricultural extension agents which is now used everywhere.

Each year from 1969 to 1972 the Cameroon director spent two months in the north running seminars. Eventually, in 1973, a delegate was appointed for the north, and an office opened in Maroua in 1978. Offices in the English-speaking area at Bamenda and in Yaoundé were also opened in 1978. Cameroon is the only country to have four *INADES-Formation* offices. The Yaoundé office has now become the national centre, with the other three co-ordinating their work with it. The map on page 212 shows the location of the four offices.

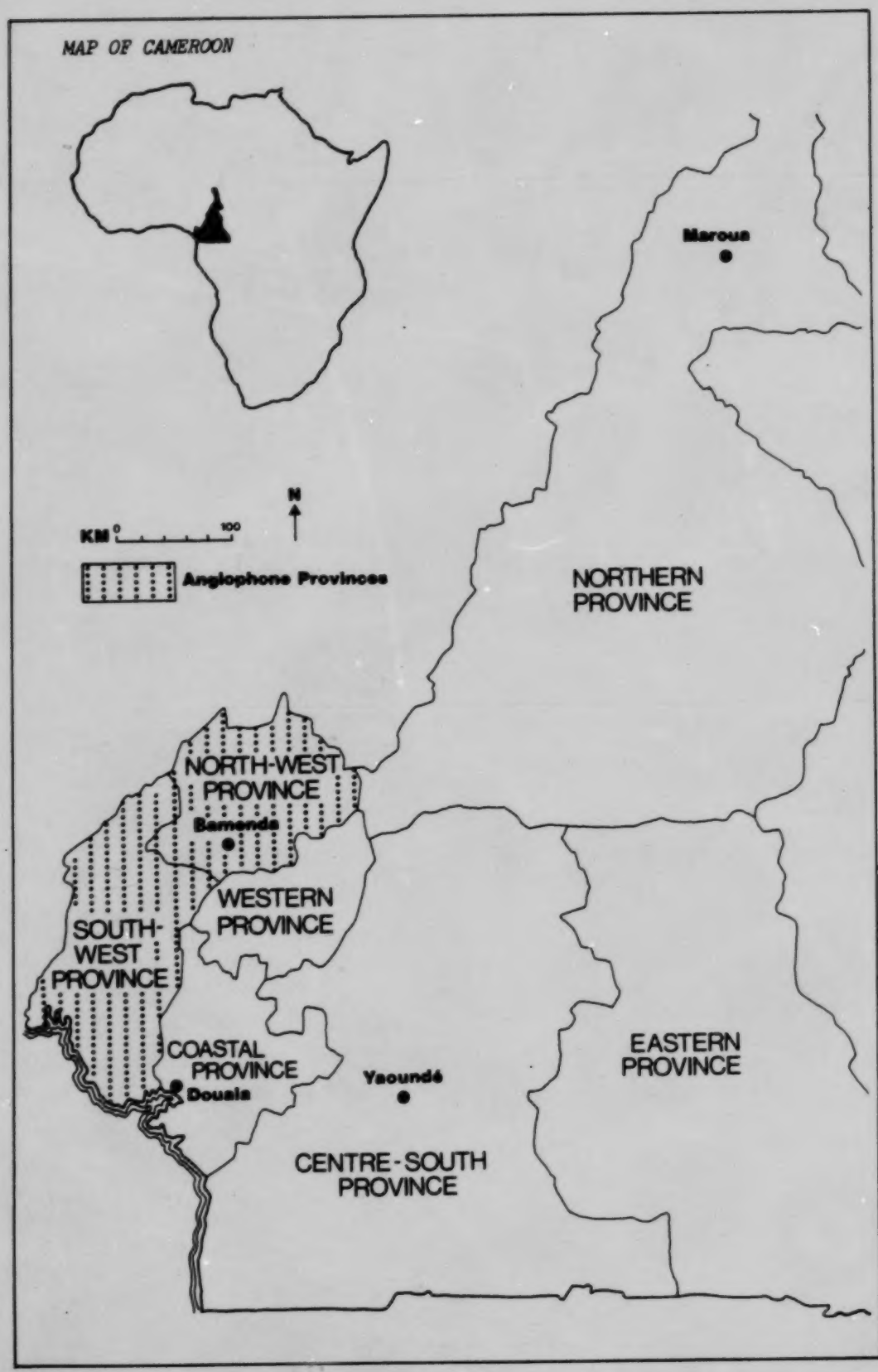
Why several offices?

Cameroon is a large country with a sparse population of about 8 million (7½ million at the 1976 census). The land area is 475.4 thousand km^2, with a population density of 16.1 per km^2. Most of the people are small farmers. A recent report estimates an agricultural population of just over 5 million, with half of these active members of the labour force. The cultivated area is about 1½ million hectares (World Bank, 1980, pp.31-32. Figures from 1972-3 agricultural census). Demand for the farming correspondence course has grown over the years (see Table 1). The French language is known well, except in the northern province and the two English-speaking provinces in the west. The literacy rate is said to be high in the south. Correspondence study has proved attractive to many educated farmers with smallholdings and no agricultural training. At the same time communications are poor: the only reliable means of transport between Douala and Yaoundé, for example, is by air. Many of the farmers live in areas that are extremely difficult of access. There were serious problems in maintaining sufficient contact with students whether by post or by visiting them, with only one office. So regional offices were the natural consequence.

TABLE 1 : Enrolments in Cameroon on agricultural courses

	1.10.77 - 30.9.78	1.10.78 - 30.9.79
Year 1	241	452
Year 2	100	53
Year 3	28	28
Year 4 (course for agricultural extension agents)	38	30
TOTAL	407	563

Source: *INADES-Formation* (1980), pp.4-5


MAP OF CAMEROON
Maroua
N
KM 0 100
Anglophone Provinces
NORTHERN PROVINCE
NORTH-WEST PROVINCE
Bamenda
WESTERN PROVINCE
SOUTH-WEST PROVINCE
COASTAL PROVINCE
Douala
Yaoundé
EASTERN PROVINCE
CENTRE-SOUTH PROVINCE

At the same time the national agricultural extension service is poor. One agent may look after anything between 150 and 2 000 farmers (we were not able to obtain more precise figures). Those with few farmers are attached to special development projects or societies marketing a particular crop. Almost all extension agents are poorly trained. The norm seems to be about one month's training before they are sent out to villages. They may have up to ten villages to service - although in two areas we were told of agents who were responsible for 20 or more villages, each with about two dozen farming families. They have no transport provided, their pay is low and they are required to perform a large number of administrative and distribution tasks, with little time, let alone training, to teach farmers modern methods of agriculture. There are, however, a number of large development agencies for specific cash crops. SODECOTON, for example, (the Society for the Development of Cotton) is a national company which promotes the growing of cotton, and has the monopoly of marketing. Similar companies exist for all major cash crops. The societies concentrate efforts in areas particularly favourable for the crop in question. Agricultural extension agents in such areas are generally attached to the society. These agents are expected to instruct farmers in two or three specific techniques. With regional offices *INADES-Formation* is better able to establish a number of training schemes for extension agents attached to these projects. Agents follow the correspondence courses and attend occasional seminars that are related to their work.

Support for farmers enrolled on courses, too, becomes more relevant with regional offices. The tutor knows the crops, the soil and the farming practices in the region. He may even know the farmer. The regional office in Bamenda has an additional role: it serves the English-speaking region of Cameroon and therefore uses an English version of the course. The staff of all four offices are concerned in adapting the course to their region, and contribute suggested amendments to the Ivory Coast office. Some offices produce their own supplementary materials, such as agricultural calendars.

The regional offices

The core of the work of each office is the support of the correspondence student. However, each has its own problems and its own attitude to its work.

The Yaoundé office

The office has nine staff, of whom four are concerned with the correspondence course in farming. This office contains the national directorate, and the director's time is almost entirely absorbed by national affairs - administration, co-ordination of the work of the four offices and external relations with such bodies as the Ministry of Agriculture. One secretary works with him.

The other staff are a women's community development worker, a health educator, two agriculturalists, a sociologist, a secretary and a watchman. The first two are not concerned with the agriculture course. The three other professional staff run seminars and do all the correspondence marking. The secretary does all the administrative work.

The sociologist is also responsible for *INADES-Formation*'s radio work. The national radio broadcasts a weekly 20-minute programme for farmers, 'The Rural World'. *INADES-Formation* contributes between two and five minutes each week to the programme. The time is used to answer questions of general interest raised by correspondence students in their assignment sheets. Transmissions are broadcast in French and English. (There is no television in Cameroon.)

Apart from the radio work, the distinctive feature of the Yaoundé office is the development of new areas of work. A two-year project, with a French volunteer, was concerned with helping villagers to find sources of clean water. Now the emphasis is on health education. The health educator, a Cameroonian who is a trained nurse, has trained villagers as primary health workers who have already established mother and baby clinics in a few pilot areas.

The Maroua office

The office was opened in early 1978, although there has been an *INADES-Formation* delegate in the north since 1973. The staff consists of a delegate, four professional staff and a secretary. A further person was due to join the team at the end of November 1980. The office works in the Northern province, with an area of 264 000 km^2 and a population of 2 300 000. At the moment there are 615 students, and numbers are increasing rapidly.

Because the region is so large, the staff are at present reorganising their responsibilities, so that each looks after a particular area. This will enable them to get to know students better, develop work in their region, and establish more stable links with the agencies with which they work. One link of particular importance is with SODECOTON, the cotton agency, which enrols 200 agents a year.

The Douala office

This office is staffed by four people. The delegate in charge is the former director in Cameroon. He is an agriculturalist and marks all the assignments. He also works on revisions and additions to the course material and attends seminars. The second person is mainly concerned with organising seminars, and with visiting students, rural communities and government agricultural offices. The third, an expert in co-operatives, has just arrived and is concerned with the development and trial of a new course, in rural community development, due to be published in mid-1981. There is also a secretary.

The office originally looked after students all over Cameroon, but now limits itself to students from the Coastal and Western provinces. In 1978 new enrolments on the first year of the course for these provinces were about 80 and 120 respectively.

The Bamenda office

A regional delegate has been in Bamenda since 1978, but the present office was only opened in June 1979. It takes students from the two anglophone provinces, the North-west and South-west. The staff consists of five people: four professional staff and one secretary. The work consists of administration and marking correspondence scripts, follow-up in the field of individual students, and seminars. 186 students have enrolled since the office opened. The office also took over from Douala the records of 238 students.

3 : CORRESPONDENCE STUDIES

The correspondence courses

The courses for farmers are called 'Learning about agriculture' (*Cours d' apprentissage agricole*). In Cameroon there are five courses available; each is designed to take a year, and they are usually studied consecutively. Students may take as little time or as long as they like to complete each year's course, but in fact most take about eleven months.

The first year's course, 'General agriculture and animal husbandry' (*Agriculture général et élevage*), consists of ten study booklets. The first is an introductory booklet. Eight booklets cover general agriculture, from choosing a field to harvesting. Two booklets are about keeping animals.

The second year course, 'The farmer's products' (*Les productions de l'agriculteur*), consists of about 30 booklets. Students must study one booklet on calculations. *INADES-Formation* regards a minimum level of skill in mathematics as essential for improving agricultural practice at this level. The others are about different crops and different animals. Students must choose eight from the range available.

The third year series is called 'The farmer's trade' (*Le métier d'agriculteur*). This consists of nine booklets which discuss problems of management, marketing, credit and co-operatives.

In Cameroon a fourth-year course on farming has been produced. This again consists of nine booklets and develops, in more depth and according to local needs, the themes discussed in the third-year course.

The final course is called 'Agricultural extension and rural economy' (*Vulgarisation et économie rurale*). This can be studied as a fifth year or as an alternative to the fourth year. It is designed for agricultural extension agents and teaches them about communication and development in their work.

Appendix 3 lists the booklets available and their titles.

The underlying principle of the courses is that farmers should be able to understand what they are doing and should not simply follow instructions. Each year of study therefore develops this understanding. Themes that appear in the first year recur right to the end. For example, in the first-year course the use of fertilisers is discussed and encouraged. In the second, the students are taught some simple calculations, so that they may apply fertilisers more effectively. In the third and fourth years of the course they discover more about analysing the components of fertilisers and calculating mixtures and quantities according to different variables.

Although one course is intended solely for agricultural extension agents, most agents enrol with the first year of the course. A question sheet has recently been prepared for the early years of the course, in order to help them to apply what they learn to their extension work. This is inserted in each booklet, and sent to those students who are extension agents. Each is in four parts: why this booklet is useful to you; technical words; discovering techniques in the village; and how to explain to the farmers.

Each booklet is thought to require about one month's study. It is therefore, in most cases, divided into four sections, each requiring a week's study. The booklets are usually between 30 and 60 pages long and are written in simple French or English. They are fully illustrated. Printing is normally only in black and white, although some recently revised booklets make occasional use of one colour in illustrations. The booklet on paddy rice, for example, uses colour to distinguish between different irrigation channels on a diagram, and also to show the colour of rice just ripe enough to harvest. Explanations of themes are followed by a page of points to think about. A glossary of technical terms is included at the end of the booklet.

Each booklet is accompanied by an assignment. The assignments are designed to test the student's understanding of the booklet and to encourage him

to apply what he has learnt in his studies. Each assignment is in three parts. The first is a simple comprehension exercise, where the correct word from the text must be found to fit in a summary. The words chosen generally refer to concepts of major importance in the lesson. If a student has selected the wrong word the correspondence tutor can see that this concept has not been understood and write appropriate comments on the student's script.

The second section of the assignment also tests understanding but goes further and asks the student to think about what he has learnt. A question, for example, may present a problem that a particular farmer has encountered. The student is required to say what advice he would give that farmer. Thus he must show that he has understood what he has read in some depth.

The third part of the assignment moves from the correspondence text to the farmer himself. He is asked to complete a questionnaire giving information about his own practice in the kind of farming discussed in the lesson. He must then justify that practice and discuss what sort of changes he should be making.

Finally there is a space at the end of the assignment for students to raise any problems. This not only encourages close contact between tutor and student, it also provides *INADES-Formation* with information for evaluating and revising the booklets and ideas for their radio programmes.

Method of study

Students may study as individuals or in groups. *INADES-Formation* welcomes group study but it is not always possible to arrange this. Where students do form a group they are free to organise meetings as they like. Some groups meet simply to send off their assignments or collect corrected assignments. Others meet regularly and do a great deal of their study together. Groups with some illiterate members do all their studying together. One such group near Maroua meets once a week, every Sunday evening.

Group work is seen to be particularly important during the first two years of the course. Discussion, as students themselves confirm, helps students to understand and accommodate new and difficult ideas. Members of groups studying the second-year course choose five booklets together and three individually.

The procedure of study for both groups and individuals is as follows. First, students spend about four weeks reading and considering the lesson booklet. They then complete the intial assignment and submit it for marking. While it is being marked, they may start on the next booklet. If they do not yet have it, they will spend time revising the work in the booklet they have just completed. When they receive their marked assignment, they spend some time looking through the tutor's comments. Sometimes they are asked to repeat an assignment and in this case a further blank assignment sheet is sent to them instead of the next study booklet. This procedure continues till the course is completed.

The method of study appears to meet with the general approval of the students. The combination of group and individual study seems to work well, particularly in the first year, for what is a demanding course of study. One group told us they found the course easy, provided that they worked together and discussed the course. Several groups reported that they worked like this group, studying and discussing the booklets together and then completing the assignments individually.

Group work in the second year seemed to present more difficulties, partly because people began to study different booklets, perhaps at a different pace. Also if the groups consist entirely of young men, they are more likely to dissolve, as younger people tend to go away to work from time to time.

The students

Most of the students on the course are practising farmers or agricultural extension agents. In section 4, on the results of *INADES-Formation* work, there is an analysis of the numbers of students and their professions. Here, in order to fill out the description of the correspondence studies, we will present some examples of students.

The village of Ebangal is in a forest region in the Centre-South province. Five farmers are studying the *INADES-Formation* course in a group. We met three of them. They grow coffee and cocoa to sell, and small quantities of cassava, maize, bananas, plantains and groundnuts. Some of the food crops also go onto the market. The three were all young married men. Concerned to make a living from farming, they were also aware that they lacked training. They heard about the course from a French volunteer attached to the nearby Catholic mission. They had enrolled about a year earlier. They had already worked though the whole of the first year course and completed the book on coffee in the second year.

They read the books and wrote their answers individually. Once a month they met to discuss what they had written before they despatched their assignments. They felt that working in a group helped them to understand the course better and that it would be difficult if they worked entirely alone. A sixth member of the group had in fact dropped out, but the remaining five claimed they had never thought of giving up the course. In addition to studying the booklets they listened to the radio programme for farmers every week. Each member of the group had his own radio. They found the radio programme interesting and helpful and also hoped they might occasionally hear answers to their own questions.

When they had completed their assignments they handed them to the French volunteer, who visited Yaoundé once a month. He returned, bringing the next book of their course and the previous month's assignment marked for them.

During the year of their study they felt that their farming practice had changed a great deal. They had learnt, for example, to prune coffee, how to distribute plants in a coffee nursery and how to apply insecticide to their coffee trees. They emphasised that they had come to understand more than they could yet practise. One problem was that they did not have private fields. In their village, farmers worked the village land in groups. All five were in the same work group, but the other members of the group sometimes refused to follow their advice. They explained, for example, that they could not persuade their neighbours of the point of pruning coffee trees. They felt that they would only be able to convince them when the other farmers saw the difference in harvests resulting from modern methods of farming. In addition, the modern methods required a great deal of physical labour. In some cases they had been able to calculate that such labour paid off. For example, the old method of planting groundnuts required only two days of work, but the harvesting was very long. They could see the benefits of spending more time planting carefully and saving time on the harvest; but the old people, they said, would not change. The group had also learnt that bush fires were a destructive way of preparing fields. However, they simply were not able to find time to prepare land for their food crops without burning. They had, however, stopped burning fields which were to be used for cash crops.

It was clearly no easy matter for this group to apply everything they learned. Moreover, although they got some support from the local volunteer, the agricultural extension agent was no use to them at all. They said that they saw him sometimes on market days and that occasionally he came round with products for treating their plants, but he never came to their fields. None of them could actually remember when they had last seen him.

The group at Seradounda was again one of five men. The village is about 50km from Maroua in the Northern province. The main crops grown by the group were cotton and millet. They also grew some beans, sesame, sorrel and groundnuts. Three members of the group were at our meeting. The group leader had

completed four years of primary school. Another member had completed seven years and the third had never been to school and could not read. The two absent members had had five years of schooling. The group started the *INADES-Formation* courses about two years before. Two of them went to a seminar for farmers where *INADES-Formation* representatives were present. They returned from the seminar with a sample book of the course. One of the *INADES-Formation* staff knew of their interest and visited them at home. The two found three others to form a group and started studying.

They met regularly once a week and did all their studying together. They gathered in a hut that they and other villagers had built for community use, with a blackboard, a lectern and seats round the walls. As a group, they had also bought a field to work together. They alternated between working on this group field and on their own individual plots. It was only in the group field that they were able to practise what they had learned. Their individual plots were, like most of the land in that area, leased from landlords. With a substantial rent to pay and no security of tenure, they felt that it was not worth the effort of improving the land with fertiliser and deep ploughing. The group field was proving a commercial success, and the group expected to buy a donkey with this year's profits.

When the group encountered something they didn't understand, either in the course or in their practice, they discussed the problem and tried to solve it. If they were unable to solve it, they sent their question to their correspondence tutor. They sent their assignments to the *INADES-Formation* office by hand, finding someone who was going that way. They received marked assignments back in a week.

They often saw their local agricultural extension agent. One group member had seen him two days before our meeting. They generally had to look him out, and felt he didn't have much technical knowledge. However, he had himself just enrolled on the *INADES-Formation* course.

The group had then completed three books in the second year of the course. They had never been tempted to give up, although they received very little outside support, except by correspondence. They didn't know of the radio programme for farmers: not one of them had a radio set.

The first chapter of this report opened with a visit to Simon. He lived in Nkondjock, which is an exceptional area in the Nkam region of the Western province. Just after independence in 1960 the region was regarded as seriously depopulated and was also a centre of guerilla activities. In order to re-establish stability in the area, the army bulldozed a road straight through the region. The government then planned to populate the area by immigration from other regions. From 1966 on young people were invited to come there as pioneers. The project, known as SODENKAM, has had limited success. People are reluctant to leave their home areas, even with the incentives provided by the project. There are now 17 pioneer villages, with 6 000 inhabitants in all; 1 750 pioneers and their families. Each pioneer is given land, a hut, seeds and basic tools, and subsistence money for three years. There is an agricultural extnesion agent for each village.

After nearly 15 years, the area still has an air of impermanence. Access is difficult. The nearest good road is 57 km distant; the military road remains a dirt road - or rather mud mixed with craters and rocks. It winds up and down mountains, sometimes above the clouds. It is difficult to leave Nkondjock once you are there, though 15-20% of pioneers do so. Those that stay, like Simon, do eventually establish themselves, but they need a lot of help: even if they are experienced farmers, they must work with virgin land in a climate and with soil that is often different from their home villages. *INADES-Formation* courses have proved invaluable and there were at the time of our visit 124 students in the area. Among these are many of the agricultural extension agents.

Philippe was one of these, living in the village of Male. We met him at dusk, returning from work in another village on a borrowed motor bike. He

wasn't expecting us, but within 15 minutes had collected in his house a group of four *INADES-Formation* students. He himself had completed the four years of the farming course and was studying the course for extension agents. He told us he had come to Nkondjock nine years ago, having complete a mere one month's training. He said he was much more confident than his colleagues. When he had finished that year's course he would be promoted to the level and salary of those with three years' agricultural college training: the Nkondjock project director encouraged agents to enrol by offering this incentive of promotion. Philippe's confidence and competence was manifest in the way he was able to talk opening about his initial failings as an agent in the presence of his clients, farmers who had studied the *INADES-Formation* course alongside him.

Frederick lived in the English-speaking area and was a prison warder at Mbengwi. His ambition was to leave the prison service and become a farmer. Meanwhile he was learning about farming and building up a poultry business. He was a compulsive self-educator; he had studied a British commercial course on farming before, and was also studying from textbooks for GCE A-level economics and economic history. In January 1980 he enrolled on the *INADES-Formation* course, when a local extension agent told him about it. He had already finished the first year. At the same time he started keeping pigs and chickens in his small garden. He was cross-breeding pigs, and already had 200 chickens, which he hoped to build up to 300, buying day-old chicks from abroad to start his stock. He had learnt new techniques for animal care from the course and had already won third prize in a district breeding competition.

Conclusions based on visits to these and other students are bound to be subjective. Some impressions are, however, worth recording. First the students had in common their ambition, often for the development and prosperity of their village as well as for themselves. All appeared to be strongly committed to farming as a career for themselves and as a way forward for their communities. Most but not all were young. Most but not all had several years of formal education. In fact many of them conformed to the type of progressive farmer so often seen as the prime target of agricultural extension agents. Second, the students were committed to the course. It was quite startling to arrive with *INADES-Formation* staff, in village after village, often miles from a main road and often with no warning, to be met by students coming from their houses carrying their correspondence assignments ready to be marked. And the enthusiasm and seriousness with which the farmers were ready to discuss the correspondence course was remarkable. There is no doubt, after meeting the students, that the course goes a great way towards filling their needs and that they enjoy and are satisfied with the mode of study. Questions remain about those who are not reached by the course and these will be discussed in the section on results.

The administration of the course

Farmers or agricultural extension agents who enquire about the course are not necessarily immediately enrolled. They are given the introductory booklet to the course (no. 0) to work through, to see how they like it. When individuals enquire about the course, particularly if they are isolated, *INADES-Formation* warns them of the difficulties of study by correspondence and suggests that they try to form a group or, at least, that they think carefully before enrolling.

If a student decides to enrol he will complete the assignment which accompanies booklet 0. This includes a personal enquiry form about the farmer, his educational and farming background and his reasons for doing the course. No mark is given for this assignment. He is asked to send a small fee with this form, which is little more than a token of his seriousness. Students who fail to pay the fee are not penalised at this stage.

When the first assignment is received at the *INADES-Formation* office a

report card is made out for the student, using the information given on the assignment form. This become the permanent record for the student's progress.

At this stage further books are sent to the student. Most offices despatch two books at a time so that a student always has one in hand. The Bamenda office prefers to send one book at a time, asking the student to revise the book he has just completed while waiting for his next one. When each assignment arrives in the office it is marked immediately. Although the work load of marking varies a great deal from day to day, *INADES-Formation* staff give priority to marking scripts and getting them back out of the office. The average time required for marking one assignment is half an hour, although one experienced marker takes about ten minutes to mark each assignment. Marking is extremely thorough. Corrections and explanations are given for every wrong answer, and encouraging comments written on good work. Some assignments, where difficult questions are raised in the correspondence section, may require research and take up to two hours to mark.

The date, the mark and the tutor's comment are entered on the record card before the assignment is sent back. About 15 minutes are needed to process the receipt and despatch of each assignment.

The time between a farmer sending his assignment to *INADES-Formation* and receiving it back varies between a week and a month. Often, students find a more reliable means of transport than the post. Those students who have to wait several weeks do not seem to mind. In a 1975 survey 20% of students complained about delays and losses in the post; the rest were satisfied (Duhameau, 1975). The important thing seems to be the reliability of the return.

Occasionally a student is sent a second assignment form rather than a new booklet when his assignment has been marked. This occurs if the original assignment was poorly completed, and was awarded less than half marks. The student is then asked to re-do the booklet and the assignment. There are no records of whether or not this particular procedure affects the motivation and completion rate of the students. However the tutors at *INADES-Formation* claim that students in fact repeat assignments quite readily. Some tutors, indeed, feel that students would be more likely to drop out if they felt they were getting undeserved high marks and uncritical comments.

This procedure continues until the student completes the first year course. If a student fails to send in work regularly he is sent a reminder after three months of silence. The record cards are designed to make this an easy administrative job; a plastic marker is inserted in one of the holes at the edge of the card, to indicate the month the last assignment was received. Students often start sending in work again after such reminders; one group told us most people take a rest for a few weeks some time during their course. A reminder or a seminar helps them start again.

When the student completes the first year course, he is invited to enrol for the second year and asked to make his choice amongst the titles available. At the end of the second year and again at the end of the fourth year the student receives a certificate. It is at this point only that those who have not paid their fees are penalised: no certificates are awarded to debtors.

Other support of correspondence studies

We have already mentioned that *INADES-Formation* contributes an item weekly to the national farming radio programme. We have no evidence on the impact of this programme, apart from the fact that a number of students we met informed us that they listened to it regularly. One group mentioned specifically that they listened in the hope of hearing answers to their own questions. On the other hand, we also visited a group where no radio was available and students had not heard of the programmes. It would be of value if *INADES-Formation* were to make an assessment of the impact of their radio work.

The quarterly journal *Agripromo* is also intended to supplement the correspondence course and *INADES-Formation*'s other work. The journal is

particularly aimed at extension workers and others engaged in community development. Again there is no information available on its impact. There were 123 subscriptions in Cameroon in 1979. No records were kept of sales of individual copies. By October 1980, however, nearly 160 agents and their chiefs in the SODECOTON project were subscribers. 90% considered it interesting or very interesting and 95% intend to renew their subscription (Brunel, 1980, p.68).

The main contact with students supplementary to correspondence tuition is through seminars. *INADES-Formation* sees the seminars as being a means of encouraging villagers to take part in developing their community, of creating a dialogue between officials and local people. A typical seminar lasts three days, with a topic decided in consultation with those who have requested the seminar, and with the local agricultural authorities. Once the programme has been decided, invitations are issued to local farmers, including *INADES-Formation* students, extension workers, and agricultural authorities. *INADES-Formation* likes to get officials and farmers working together in the same room, to initiate a dialogue which is otherwise lacking. Participants may be asked for a small contribution; for farmers this may be in kind, such as food or fuel to help the group through the three days.

Each seminar has three parts. After the opening, there will be an enquiry. Questions are posed about current farming practice in the area and the most serious problems. For example, in a seminar on rice production participants may be asked to say how they cope with bird control. The questions are presented to the whole group - generally between 20 and 30 farmers - then participants divide into five or six groups, and each group discusses and answers the questions. When they are ready, the groups report back. In the second phase, the seminar leader invites the groups to comment on each other's conclusions. The leader then starts a discussion on problems, and contributes what he can to solutions. The third phase consists of practical work on the farms, demonstrations and discussions. Finally, the members raise any remaining questions. People may also enquire about the *INADES-Formation* correspondence courses and enrol at the end of the seminar.

A full report of each seminar is written immediately afterwards, duplicated, and a copy sent to every participant. Seminars are not therefore designed specifically for correspondence students. However, when a seminar is planned for a particular area, the local correspondence students are invited. *INADES-Formation* feels the students ought to attend two seminars a year, if possible, if they are to get the greatest benefit from their courses. It is possible that work in the seminars is more effective when correspondence students are strongly represented among the participants. *INADES-Formation* recently spent some time on a campaign for clean water. While seminars were conducted in a number of places, explaining how to filter water and offering advice on providing household water supplies, one assessment is that the project had most effect in the area of Nkondjock. In this area there is, as we have seen, a concentration of *INADES-Formation* students. Many of them have set up household water supplies. One might conclude that the correspondence students have gained particular benefit from the seminars. But there is also the possibility that the community as a whole has gained more from the seminars simply because those already in training with *INADES-Formation* were able to support the ideas and bring them into more open discussion in the community. *INADES-Formation* staff feel about all their work that an isolated piece of training is of little use. They prefer both to work with other agencies and to work towards integrated rather than partial development.

Seminars are also a way of recruiting students. A number of those we met indicated that they had first heard about *INADES-Formation* by attending a seminar. Quite often these were seminars organised by another agency but with contributions from *INADES-Formation* personnel. In addition, students who have completed their courses gain encouragement from continued contact with *INADES-Formation* through seminars.

What do students expect to gain?

Students who complete two years of the course receive a certificate and a second certificate is issued after four years. These are simply certificates of completion and a warning is issued to new students that they should not expect any kind of formal qualification to result from the course. Nevertheless there are certain advantages to be gained from course completion for students in Cameroon. There is a government scheme, FONADER, offering credit to young farmers who prove themselves to be hardworking and progressive. Those who complete the first two years of *INADES-Formation* courses are eligible for this credit. However, the procedure for obtaining it is lengthy and laborious, even to those eligible. *INADES-Formation* therefore does not advertise too strongly that this is an option for its successful students, but staff offer to help those who are on the point of completing courses if they wish to apply for credit and have any difficulty with their applications. Second, for agricultural extension agents, there is the chance of promotion. Many hope that completing the *INADES-Formation* courses will enable them to get promoted. In one case, the SODENKAM project, promotion is automatic by agreement with the project director.

Most of the rewards of the course therefore lie in the land. Farmers following the course expect to produce more crops and to increase their incomes. They also expect these rewards to take some time to appear. In the next section we shall consider how far the evidence shows that these expectations are realistic.

4 : RESULTS

The students

Table 1 gave details of the numbers of students enrolled in Cameroon in 1978 and 1979. There is a steady growth in enrolments each year. Students tend to be concentrated in regions which are accessible from the offices but, as offices have opened in new regions, the number of students in those areas has increased rapidly. In the two provinces that are still far distant from *INADES-Formation* offices, the east and the south-west, there are as yet few students.

Table 2 shows the occupations of the students. The information is taken from a sample of every fifth student enrolled in 1978 and 1979 in the three francophone offices. Those not farmers or agents are often teachers; people who do not farm, or work with farmers, are not encouraged to enrol.

TABLE 2 : Occupations of *INADES-Formation* students

	Maroua	Yaoundé	Douala	Total
Farmers	10	21	20	51
Agents	36	5	5	46
Others/not stated	-	8	12	20
Total	46	34	37	117

The enrolment figures indicate that there is a steady demand for the farming course, though those enrolled are a minute fraction of the country's 2½ million farmers. It is worth considering why the course does not attract more enrolments. First, some applicants are not encouraged to enrol. *INADES-Formation* feels it important that the correspondence students should receive as much support as possible in their studies. Group enrolments are therefore welcomed, whether these are formal study groups or loose groupings of students in an area where there is a mission, a community development project, a government agricultural project or some other structure which may offer support to the students. Applicants who are isolated and who have a poor educational level are not positively discouraged from enrolling, but the difficulties they may face are put to them clearly before an enrolment is accepted. It may be that *INADES-Formation* is unnecessarily cautious, but the argument that the *INADES-Formation* staff put forward is a strong one. The farmer who alone tries to innovate in a village is likely to become the target of hostility and jealousy. It is felt that farmers need the support of friends or of some formal agency in introducing change.

There are other broad categories of students who are not reached, simply because the course is unsuitable for them. One barrier is illiteracy. Very few illiterate students follow the courses. At one time *INADES-Formation* was enthusiastic about groups of mixed literate and illiterate farmers studying together. In practice this did not work well and so such groups are no longer actively sought out. However, a few do exist and the one which we visited at Seradounda was certainly active and learning a great deal from the course. This particular group had committed themselves to the course by buying a group field to farm together. Groups held together simply by the literate members' sense of duty to support the non-readers are far less likely to persevere.

Another barrier is language. In some countries, *INADES-Formation* courses have been translated into local languages. In Cameroon, while French is widely known in most of the country, and English in the western region, the number of other languages spoken is so great that translation would make much less sense. It is theoretically possible for French or English speakers in a group to provide translation for other members, but in practice this does not

happen much. Again, in the group visited in the north, with non-literate members, the group leader and those who were more fluent in French provided a translation for those whose French was poor. Other groups indicated that they discussed the course material in their own language. Groups in English-speaking areas normally discuss in pidgin, which is spoken and understood far more widely than standard English. It remains true that farmers in areas where French or English is not well known are at a disadvantage when it comes to enrolling on the correspondence course.

Both these disadvantages apply to women. And indeed there were only a handful of women amongst the students on the farming course. When asked why, *INADES-Formation* staff immediately mentioned illiteracy. But there are other barriers which would still be there if all the women farmers were literate. One woman, for example, the wife of an *INADES-Formation* student, was asked why she herself had not enrolled on the course. She shrugged her shoulders and said, 'I have no time.' In Cameroon, as in many other countries of the third world, the division of labour between husbands and wives in farming families is one which weighs heavily on women, who must produce food crops as well as looking after the house and the children.

In addition there are problems in suggesting that women should study in groups with men. Some husbands and wives do share their studies, like Simon, whom we introduced at the beginning of this report. The two women students whom we met both studied in an acceptable social setting. One studied in a group with her brother and brother-in-law. The other was a primary health worker in a village and had heard of *INADES-Formation* through this work. She studied in a group with other health workers of both sexes. It seems that her health work had removed barriers which might have existed if she had wanted to study farming with a group of other farmers.

Though a few women farmers are enrolled on the course, the correspondence course has not proved to be the right way of helping women farmers, and it is probably correct to say that it will never be so. *INADES-Formation* recognises that it has failed to reach women and is searching for a way to do so. They hope that the correspondence course to train village community development workers, due to start in mid-1981, will at least provide a beginning.

The effectiveness of the course

One measure of effectiveness is the rate of completing the course. Table 3 contains details of the rate of completion of the first year and continuation into the subsequent years for every fifth student enrolled in 1978 and 1979 in three of the four Cameroonian regions.

TABLE 3 : Continuation rate of students enrolled in francophone regions of Cameroon, 1978-9 (20% sample : n = 113)

	Total enrolled	Year 1 completed a/	Enrolled on Year 2 a/	Enrolled on Year 3 a/
Farmers	51	14	15	5
Agents	41	31	20	8
Others/not stated	21	9	5	1
Total	113	54	40	14
Percentage	100%	47.8%	35.4%	12.4%

note:

a. Sample surveyed November 1980. Some students are still continuing their study.

The rate of completion of the first year of the course is quite remarkable for correspondence students. It is the sort of rate one would expect to find in teacher-training programmes, which promise promotion to successful students (Young et al., 1980, p.34). In this case, the students have very little formal education - generally between four and six years of primary schooling - and, with a few exceptions among the agricultural extension agents, no firm promise of promotion or financial reward for completing the course. In this context the completion rate is a tribute to the value of the course itself.

However, there are only a handful of students who continue through to the fourth year of the course, Table 1 showed that at best one student in six gets this far. Table 4 gives an example of continuation taken from a survey of students of the SODECOTON project. All these students were agricultural extension agents, or their immediate superiors. Section 5 includes more information on continuation. It is a disappointment to *INADES-Formation* that so few carry on to the point when they are trained in the management of their farms and in community development techniques, as well as in the culture of crops, and in animal husbandry. *INADES-Formation* feels that its students need to complete at least two years of the course.

TABLE 4 : Proportion of extension agents continuing to next year

year	1976-7	1978-9	1979-80	n/N a/	Average over 3 years
series of course					
Year 1	63% (58%)	80% (76%)	67% (58%)	176/253	70% (63%)
Year 2	3/3	85% (80%)	81% (77%)	90/107	84% (82%)
Year 3		2/3	82% (81%)	72/88	82% (81%)
Year 4		9/11	1/2		10/13
Average of each year	64% (58%)	82% (78%)	78% (73%)		75% (70%)

Source : Brunel (1980), p.13.

notes:
Percentages outside brackets exclude drop-outs during the year
Percentages in brackets include all enrolments (exact number given with less than 40 students per cohort)

a. n = total number continuing to next year
N = total number who started year just completed.

From talking to students, however, it is probable that even those who have studied the course for only a few months become more competent farmers, the objective of the course. All the students we talked to were able to specify things that they had learned. What was impressive was the way they went on to discuss the application of what they had learned. In one discussion, for example, in a forest area, the group members started by saying that they had learned why they shouldn't make bush fires and why they should dig out the roots of trees. They then went on to discuss the practical problems of applying these techniques. They pointed out that with a shortage of labour they simply could not manage to dig all their land instead of burning and were still compelled to burn some of it in order to have enough food. Second, they said they just didn't have the energy or time to take out all the roots.

They had understood what they had been taught in the lessons and reached a compromise, deciding how best to do things on their own land. Another group described how they had selected some farming techniques and rejected others. They had to farm on leased land and therefore weighed up the benefits and disadvantages of improving soil that might not remain theirs to farm. Yet another group had begun to use herbicides on their coffee plantations. They had used the calculating techniques learned from *INADES-Formation* to work out that the time saved in weeding was worth more than the cost of herbicides.

INADES believes that farmers must understand the principles of farming, and the reasons behind farming practices, in order to become efficient and independent. Such independence is far more difficult to achieve than technical competence alone. Some correspondence students related examples which showed they were on the way to achieving this. A group described how they now knew why they should space out coffee plants, because the plants take food from the ground; before, they planted close to reduce weeding. Another student said, quite simply, that *INADES-Formation* had changed his way of thinking, because he could relate what he learnt to his way of life.

The farmers seemed to be well satisfied with the benefits that had come to them from practising what they had learned in the course. One measure of their success is the way that other farmers have followed their example, both in the fields and by studying the course. Initially, *INADES-Formation* students often have difficulty persuading others, particularly older people, to adopt their new methods. One farmer could not persuade his fellows to prune the side shoots from coffee plants; they told him, 'That's *INADES*, that's not my father.' But often that mistrust shifts to admiration and emulation when results become visible. One group in the village of Mvomo told us they had enrolled on the course after hearing about it from a group in a village 15 kilometres away, through thick forest. They saw this group planting maize in rows, and using fertiliser, which they had never heard of before.

Farmers who study the course can also stimulate extension agents to become more effective; they see their clients become more expert in farming than they are. The agent for the village of Mvomo was so interested and impressed by the changes the group was making on its land that he was planning to enrol. We met fewer agents than farmers, but those few were articulate about the benefits of the course. One, who had recently started the agriculture course and the extension agent's course simultaneously, said he was learning quite different things from those included in his training. In particular he had become aware of the need to get to know his environment thoroughly, to learn to communicate effectively, and to be expert in his work and set a good example. His demonstration garden, established only a year, provided evidence of his hard work on the practical level. Others stressed particularly how the course had helped them learn to communicate more effectively with their clients.

One story indicates the confidence of *INADES-Formation* farmers. A group in a coffee growing area wanted to market their coffee separately from other villagers, since they felt that the methods they had learnt from *INADES-Formation* had resulted in a crop of better quality, and therefore of higher value, than that of other villagers. They were in the end persuaded that such separation of the crops was against the spirit of unity in the village. However, the incident does indicate that they were proud of their harvest.* From the fields, gardens, and animal pens that we saw as we visited the students they were probably rightly proud. Certainly the *INADES-Formation* farmers we met were characteristically neat, competent, and well ordered. One group with whom we talked said that they felt that the main difference between themselves and other farmers was that farmers trained by *INADES-Formation* were well organised.

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* In theory, if coffee is not interplanted, it will yield 1 tonne per hectare instead of 300 kg, even if no other change is made.

Another interesting and unmeasurable benefit mentioned by one group is the way *INADES-Formation* teaches people to make do with and make the best of their existing resources: 'We don't become the slaves of the modern world.' The course books certainly reinforce this comment. The book on fish farming, for example, shows how to make a container for carrying fish to market on the back of a bicycle. It also explains how to use the bicycle pump to renew the fishes' oxygen supply on the journey. The book on pigs also shows how to transport a pig by bicycle, and explains how to provide iron for piglets by mixing earth in their water. And we saw this spirit at work too. Jean Luc, for example, breeds chickens. He has built a pen for his chicks and broody hens made entirely of local materials - except for wire netting, nails and a padlock.* The roof is of palm fronds neatly woven round bamboo. The chicks are inside the house, and drink from a bamboo trough. The hens each have their own nest box - literally a box on its side - with a neatly cut flap of old sacking as a door. The cock, an imported breed, is kept out. The hens lay well; one had just hatched 19 chicks. The poultry is in great demand locally and Jean Luc is beginning to make a good income from his poultry breeding. All it has cost him in cash is the price of a cock and some wire netting, nails and a padlock.

We do not, however, have any details of crop production or points of comparison to evaluate these feelings of achievement, or go far beyond these subjective impressions. There are further difficulties is assessing *INADES-Formation* because the benefits of good farming and of good organisation are long term. Those who are studying with *INADES-Formation* now are likely to reap the full benefits of their studies only four, five or more years ahead. *INADES-Formation* has carried out a few studies of knowledge and practice among farmers and extension agents studying the courses. These look at short-term gains in knowledge and give only a limited impression of the effects of the course. Follow-up studies when farmers have had more time to assimilate and apply what they had learned might present a rather different picture.

In 1974-5 an assessment was made of the progress of students in three countries (Duhameau, 1975). The sample included 75 students from Cameroon; 64% of these were farmers, 34% agricultural extension agents and 2% artisans. One of the questions concerned the application of techniques learned in the course. 28 indicators of practice were designated, including such things as planting cotton in lines and the application of chemical fertilisers. Among those farmers who applied these techniques, some claimed to do so as a result of *INADES-Formation* teaching. The students were asked whether they applied the techniques because of *INADES-Formation* or because of a local agency. It looks at first sight as though local agencies, such as agricultural extension officers, are more effective as promotors of innovations than the INADES course. On the other hand, the *INADES-Formation* course does not work in isolation. The evaluator cites one comment as representing the feelings of many farmers who took part in the survey:

> 'The agent tells us to do this or that. I used to do it because I had to; because the agent would get angry if I didn't do it. But now that I have read in the *INADES-Formation* books that these new practices are good, I do it with pleasure and I have been able to make my family understand that it is good' (Duhameau, 1975, p.26, our translation).

Duhameau goes on to comment that a detailed examination of the behaviour of the farmers who follow the *INADES-Formation* course indicates that agricultural training is only effective when the rural economy is already beginning to expand. A number of factors must contribute together to bring about the change. At the right moment the *INADES-Formation* course can be an important factor. In Duhameau's study, 86% of the Cameroonian students felt that

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* Jean Luc likes to preserve traditions, where they are useful, alongside modern ways. He called his fellow group members to a meeting with us by talking drum. He is a craftsman, too; most of his furniture was hand made.

correspondence study along was not sufficient to help them to put new ideas into practice. The long term effects, however (unfortunately unmeasured) could be very different.

Between 1977 and 1980 a number of agricultural extension agents in the cotton growing area of Cameroon, attached to the project SODECOTON, enrolled on the *INADES-Formation* course. A comparison was made between the agricultural knowledge of those who had completed the first year of the course and others who were about to start it. The sample consisted of 140 who had studied the first year and 27 in the control group. The members of both groups had broadly similar educational backgrounds, similar jobs and lived in a similar environment. They were tested on a number of aspects of the first year course and were given a mark out of 20. Those who had completed the first year scored on average 13.3 while those who had not yet started scored 10.8. Analysis indicates that this difference is statistically significant (99% confidence level). Further analysis of the progress made by those who had completed the first year indicated that two out of five of them did the experiments they are asked to do in the course. 95% claimed that they explained the things that they had learned to the farmers they worked with. They reinforced this claim by giving examples, for the most part highly specific (Brunel, 1980).

These tests, which produce similar results to others carried out by *INADES-Formation* in other countries, indicate that the course makes some, but not much, difference to the students. But there are serious difficulties when we attempt to assess how much difference it makes.

First, knowledge tests designed by an evaluator are of limited value. They do not disclose what the farmer himself found important and selected for his own use from the large amount of material in the course.

Second, questions about farmers' practice do not tell us very much. We have to rely on the farmer's description of what he has done. He may make claims that are untrue. He may equally well only mention a very small part of what he has actually done. Moreover, in farming changes in practice often do not bear fruit for months or even years. A farmer may not wish to describe something he has tried until he is sure that it has worked. Also a farmer may choose not to try a new method, because it does not suit his circumstances. There are often a number of conditions necessary to make new farming methods possible. If a farmer has to rely on manual labour, constraints of time and energy may prevent him from changing his methods rapidly.

Third, the effects of *INADES-Formation* cannot easily be separated from the effects of other agencies. *INADES-Formation* does not intervene alone in the farmer's life. Other organisations, market forces and climate all have their effects on farming.

Fourth, we would like to be able to measure the output of crops. We would like to be able to say that the modern farmer who has followed the *INADES-Formation* course produces so much more per hectare than the traditional farmer. Unfortunately, this has not yet been attempted.

But the evidence does indicate that farmers are satisfied with the course, and, on the whole, they learn from it. We can cite the way that farmers and agricultural extension agents talk about the course with enthusiasm. We can point to their tenacity in studying the course. We can show that the demand for the course continues to rise in areas where it is becoming well known. All these factors indicate the high value that is put on the course. This evidence is supported by the tests of knowledge, which indicate that farmers do learn from the correspondence course, and by the evidence on practice. One further important indicator is the way the *INADES-Formation* students grasp the reasons for applying new methods. As we have seen, students of the *INADES-Formation* course do often understand such reasons.

Alternative sources of information

Although farming is the main occupation in Cameroon, information and training for farmers is very limited. Apart from the agricultural extension agents and the materials provided by *INADES-Formation*, the only source of information we discovered is the weekly radio programme 'The rural world'. Although we met a number of farmers who listened to it, we do not know the extent of its impact.

The agricultural extension service in theory covers the country fairly effectively, with a hierarchy of agents and supervisors. Extension agents report to the heads of district agricultural stations, each of whom is in charge of about eight agents. These will have between five and ten villages to deal with, with something between 150 and 2 000 farmers.

In practice, the village level agricultural extension agent has a demanding job. First he has a number of administrative duties and is in charge of the distribution of fertilisers, seedlings and so on, and has very little time left to train farmers. Indeed, farmers often see agents as simply messengers. Second, the villages and farmers he is in charge of may be widely scattered. One agent we talked to said he was in charge of eight villages containing 150 farmers. From his home he would have to go six kilometers in one direction or eleven in another to reach the furthest village in his area. The area in mountainous. No transport is provided by the agricultural extension service. He has a motorbike of his own but is not paid expenses for using it, and, in any case cannot reach all villages by motorbike.

Third, the agents are poorly trained, often with only one month's training, and badly paid. There is little incentive to work hard and little cause to have confidence in themselves. Fourth, even if a agricultural extension agent is enthusiastic and competent, it will be a matter of good fortune if his district head is equally good. These, too, are often poorly trained and may simply be extension agents who have in the course of time been promoted, with no further training.

Finally, one of the agent's duties is to collect debts - payment for seeds and fertilisers and the like. He is not, therefore, the most welcome visitor for a farmer.

The *INADES-Formation* course therefore fills a big gap in the provision of training in Cameroon for the farmers and extension agents it reaches. It offers training to farmers who are served by poor extension agents and also training to the agents themselves. Agents may if they wish begin their studies with *INADES-Formation* with the third year course. In Cameroon almost all of them start with the first year, since they lack even a basic knowledge of farming. If they continue to the later years, their training includes work on communication and human relations.

For farmers there is one major alternative source of training. This is the residential farm schools for young farmers. However, these are few and far between and take very few students each year. As we shall see in the next section, the cost of training at these schools is extremely high. While we have no information on the quality of the training they provide, it is worth noting that they, like the few private farm schools and rural training centres, often use the *INADES-Formation* materials as a basis for or a complement to their own training courses. Even though the number of farmers reached by *INADES-Formation* is small compared with the total number in the country, the number reached by the farm schools is even smaller.

There is apparently no other source of in-service training for extension agents. The Cameroonian government has shown some interest in coming to an agreement with *INADES-Formation* for the future provision of such training. Certainly agents who display the sort of understanding of the principles of agriculture that is characteristic of the INADES-trained farmer will be far more effective in communicating with their client farmers.

5 : COSTS

As we have seen, *INADES-Formation* has a variety of activities. In order to estimate the costs of its correspondence teaching it is necessary to separate off those costs from the costs of its other activities and, in particular, from the costs of its face-to-face seminars. There is no straightforward way of doing this, as many of *INADES-Formation*'s staff, and all its offices, are concerned with a variety of different activities.

In assessing the costs of *INADES-Formation* we have made no attempt to measure the opportunity cost of the time spent by farmers or extension agents in studying, and this is omitted from all calculations.

We have looked at the question of *INADES-Formation*'s activities from a number of angles and discussed it at *INADES-Formation*'s four offices in Cameroon. At Maroua, the staff had made a study of their own activities in May 1980 (*INADES-Formation*, 1980) in order to forecast their own staffing needs for 1980/81. The number of staff at Maroua has increased since that study was made and it was not designed as a costing exercise. And, while it estimates the amount of time spent on marking correspondence assignments and on seminars, it does not attempt to attribute work on other activities, such as meetings in and out of the office. But it does estimate that the agricultural staff spent between them 321 person/days preparing for, attending and following up seminars and 145 person/days marking assignments, and that they could mark on average 15 assignments in a working day. If we assume that the other activities of the office can be attributed in the same way, we get a split of 69:31 (or, say, 70:30) for seminars as compared with correspondence work.

Comparable studies have not been made at the other *INADES-Formation* Cameroon offices. But enquiries at both Douala and Yaoundé suggest that this proportion holds true there as well. At Douala, there were, until recently, only three professional staff. From discussions with them we estimate that one staff member spent half his time working in connection with correspondence students. The other, a community development worker, was primarily concerned with *INADES-Formation*'s seminars and, in the dry season, spent as much as 15 days in every month on tour, organising and following up seminars. He marked no correspondence scripts and was not involved in editing or revising correspondence texts. We estimate that 10% of his time should be attributed to correspondence students, so that the average figures for this office suggest that 30% of the total professional activity there was devoted to correspondence students.

At the Yaoundé office there were, in addition to the director, five professional staff, of whom two were not at all involved with correspondence students. (We decided that the director's time was shared between so many activities that it was unreasonable to attempt to attribute it directly.) The other three all marked correspondence scripts and, in the light of our discussions, we think it would be reasonable to assume that they spent half their time on correspondence work. Half the work of 3/5 of the professional staff again comes to 30%.

The figures from Bamenda are rather different. Here, the office had recently been very heavily involved in a programme of seminars so that, in October 1980, for example, staff spent 26 person/days attending seminars and probably only four to five person/days marking assignments. (The latter estimate assumes that the Bamenda staff mark at the same rate - 15 assignments in a working day - as those at Maroua.) But if we look at Bamenda's figures over a whole year, we find that in 1978/79 they marked 796 assignments and were involved with 30 days of seminars and field visits (*INADES-Formation* Bamenda, 1980). From our discussions it seems that, on average, three staff members attend each seminar or visit and that the amount of time needed to prepare and follow up a seminar is as great as that spent attending it. These

estimates give us:

796 assignments at 15 per person/day = 53 person/days
30 days at 3 persons per day x 2 = 120 person/days

If we can extrapolate from these figures for professional staff time, we get 31% of the time spent on correspondence students and 69% on seminars.

These three studies therefore agree in suggesting that we may reasonably attribute 30% of costs to correspondence students.

Distance-teaching institutions have difficulty in saying how many students are working on their courses: as there are no registers of attendance, and students work at differing speeds, decisions as to when a student has completed or dropped out of a course are necessarily arbitrary. *INADES-Formation*'s own statistics show only the number of students enrolled each year, and the number of assignments marked, as in Table 5.

TABLE 5 : New enrolments and assignments marked at *INADES-Formation* Cameroon

	Enrolments				Assignments marked			
	Year 1 course	Year 2 course	Other courses	Total	Year 1 course	Year 2 course	Other courses	Total
1977/78	241	100	80	421	1 797	643	641	3 081
1978/79	452	53	68	573	2 055	1 013	733	3 801

Source: *INADES-Formation*, 1980

But these figures doe not tell us how an average student works at his courses, nor do they enable us to relate the number of assignments marked to the number of students enrolled. We therefore examined a 20% sample of student record cards for students who had enrolled in 1978 and 1979 at *INADES-Formation*'s three offices in francophone Cameroon.

We looked first at the amount of work students on the first year course had done, and at the number who went on from the first year to later courses. The results appear in Table 6.

TABLE 6 : Progress of students enrolled in 1978 and 1979 on course A1 (n=113)

	Number of assignments completed				Total	Later enrolled on second year	3rd year course
	0 - 2	3 - 5	6 - 8	9			
Farmers	8	15	14	14	51	15	5
Extension agents	5	--	5	31	41	20	8
Others or not stated	5	5	2	9	21	5	1
Total	18	29	21	54	113	40	14
Percentage	15.9%	17.7%	18.6%	47.8%	100%	35.4%	12.4%

The figures for completing courses by doing all nine assignments are probably an underestimate, as are the figures for subsequent enrolments in years two and three, as some of the students enrolled in 1979 were apparently still working at their courses in 1980. But, if we assume that the completion of two-thirds of the required work is a reasonable criterion of success, then we find about two-thirds of all students in this category. We then looked at the amount of work done by students and found that these 113 did 737 assignments. We also found that they took 908 person/months to do 727 assignments or an average of 1.25 months per assignment. (In ten cases we could not tell from the records how long it had taken a student to do an assignment.) We can therefore assume that the average student will take 9 x 1.25 or 11.24

months to complete a course. *INADES-Formation*'s intention is that subscribers should work through their courses in a year: this figure is so close to 12 months that we can in fact treat the annual enrolment figure as a proxy for the number of students taught in that year, (see note at end of section).

What are the costs?

INADES-Formation Cameroon's accounts show its expenditure and income and these are summarised in Table 7.

TABLE 7 : Costs of *INADES-Formation* Cameroon 1978-79

	'000 CFA francs		US $$ a/	
Expenditure				
Land, buildings and equipment				
annualised land and building costs b/	2 976		13 907	
rent c/	4 461		20 846	
annualised equipment costs d/	1 485	8 922	6 939	41 692
Salaries		30 222		141 224
Travel and transport				
recurrent	7 109		33 220	
annualised vehicle cost e/	192	7 301	897	34 117
Miscellaneous office costs		3 423		15 995
		49 868		233 028
Income				
Enrolments	1 839		8 551	
Sales	1 805	3 635	8 435	16 986
Net expenditure		46 233		216 042

Source: *INADES-Formation* annual accounts 1978-79 and discussions in Cameroon, November 1980.

notes:

a. We have taken 214 CFA = $1.00, the rate prevailing on 27 March 1979, in this and succeeding tables.
b. The costs for buildings are taken from the *INADES-Formation* Cameroon 1978-79 accounts. These show written down costs to allow for depreciation, so we have reflated the figures on the assumption that the Yaoundé buildings were acquired in 1976/77, the Douala building in 1971 and the Maroua buildings erected in 1975. We have then converted the values to 1979 francs by using deflators for the French franc (i.e. 1971: 50.3; 1972: 53.4; 1973: 57.1; 1974: 63.0; 1975: 69.3; 1976: 76.2; 1977: 83.7; 1978: 91.2; 1979: 100). We have assumed the land is amortised over 50 years and the buildings over 25 years. From the building costs we have deducted rent received by *INADES-Formation*. The costs have been amortised using the formula $a(r,n) = r(1+r)^n / (1+r)^n-1$ and assuming a social discount rate of 7.5%.
c. This figure, as with all other figures for recurrent expenditure and for income, is taken directly from the 1978/79 accounts.
d. We have followed a similar procedure to that for buildings, assumed that on average equipment was bought in 1976/77 and that it should be amortised over 10 years (*INADES-Formation*'s accountants depreciate equipment over 10 years).
e. The vehicle, bought second hand, is amortised over 3 years.

Before analysing these costs further, or attributing them to correspondence and other activities, we need also to look at the costs of *INADES-Formation*'s headquarters in the Ivory Coast. Table 8 shows the capital costs for *INADES-Formation*'s offices and print works at Abidjan.

TABLE 8 : Capital costs of *INADES-Formation* headquarters

	1000 CFA capital value	US $$ capital value	'000 CFA annual cost @ 7.5%	US $$ annual cost @ 7.5%
Office building a/	45 000	210 280	4 037	18 864
Housing b/	37 295	174 276	3 346	15 636
Furniture and fittings c/	21 869	102 192	3 186	14 888
Printing equipment d/	25 599	119 621	4 833	22 584
Vehicle e/	1 251	5 841	481	2 248
			15 883	74 220

Source: *INADES-Formation* annual accounts 1978/79 and discussion at *INADES-Formation* headquarters, November 1980.

notes:

a. The building is in the legal ownership of INADES, not *INADES-Formation*. An extension building, one-third the size of the present building, is now being erected at an estimated cost of 15 000 000 CFA. We therefore take 45 000 000 as an estimate of the value of the building and have amortised it over 25 years.
b. The annual accounts show a book value (before depreciation) of 21 295 700 CFA for housing, and depreciation shown there suggests that the housing was, for the most part, erected in 1973. We have therefore reflated this figure to give a 1979 price, and amortised the housing over 25 years.
c. We have carried out a similar procedure for furniture and fittings but assumed a life of 7 years.
d. We understand that some 17 000 000 CFA of printing equipment was bought in 1976 and a further 3 000 000 CFA has since been spent on it. We have reflated these figures and amortise the equipment over 7 years.
e. We have assumed that the vehicle was bought in 1976/77 and should be amortised over 3 years.

INADES-Formation's annual accounts give us their recurrent costs as in Table 9.

TABLE 9 : Recurrent costs of *INADES-Formation* headquarters in 1978/79

	'000 CFA	US $$
Staff salaries	95 522	446 364
Travel	5 468	25 551
Other charges	27 158	126 907
Printing a/	14 622	68 327
	142 770	667 149

note:

a. We have taken the net printing cost here: *INADES-Formation*'s printing department does outside printing, and generates income from it which we have deducted from the total figure for expenditure on printing.

It is necessary to decide what proportion of *INADES-Formation*'s headquarters costs should be attributed to Cameroon and what proportion overall should be attributed to correspondence work and to the organisation's other activities. *INADES-Formation* itself has not yet worked out a formula for attributing costs between its branches. The simplest measure is probably to take the number of assignments marked as a measure of the activity of any *INADES-Formation* office and therefore of the demands it makes on the headquarters. But this does not allow for the fact that a newly established office creates demands upon the headquarters although it has no enrolments and so no assignments are marked there. We therefore conclude that it would make sense to attribute half of *INADES-Formation* headquarters costs equally to its ten branches and attribute the other half in proportion to the number of assignments marked. As Cameroon had, in 1978/79, 3 801 assignments out of the total of 26 553 marked at all *INADES-Formation* offices, or 14.3%, we decided to allocate (14.3 + 10)/2% or, say, 12% of the costs to Cameroon.

INADES-Formation has considered in some detail the question of how much of the costs should be attributed to correspondence work. For the first quarter of 1979, for example, it has calculated how both direct and indirect staffing costs should be attributed to different departments of *INADES-Formation*, with the results shown in column (a) of Table 10. We have assumed that the costs of *Agripromo* should not be attributed to correspondence students and that half the costs of visits and seminars should be attributed to them. *INADES-Formation*'s figures include a proportion of the total administrative staff costs in the allocation to each section of the organisation and suggest that half of the total administrative costs should not be charged to correspondence students or to the production of *Agripromo*. Thus we have derived columns (b) and (c) to suggest how *INADES-Formation*'s staff costs should be allocated as a whole.

TABLE 10 : Allocation of *INADES-Formation* staff costs to activities

	(a) *INADES-Formation* allocation	(b) Attributed to correspondence work	(c) Attributed to other activities
Correspondence courses including follow-up	10.8	10.8	
Editing of correspondence texts in agriculture	11.0	11.0	
Agripromo	19.7		19.7
Other correspondence courses	19.9	19.9	
Visits and seminars	11.0	5.5	5.5
Research section	3.2	3.2	
Administration	24.4		24.4
	100	50.4	49.6

Source: Tableau d'imputation des coûts aux activités du siège janvier-mars 1979 (*INADES-Formation* files, Abidjan) a/

note: a. The tableau attributes only 1/5 of general costs to activities other than correspondence and *Agripromo*, although it shares the administrative costs on a 50/50 basis. From discussion that attribution seems to be arbitrary and we have thought it better to follow the 50/50 allocation throughout.

In the light of Table 10, it seems reasonable simply to allocate half of *INADES-Formation*'s headquarters costs to correspondence work. In calculating the costs of printing, however, the bulk of the costs are attributable to correspondence courses. The tableau d'imputation shows that 64% of these costs related to correspondence and 36% to *Agripromo*.

We can now summarise the costs of running *INADES-Formation* correspondence courses in Cameroon and do so in Table 11, which also separates fixed costs from variable costs, which one would expect to vary with the number of people enrolling with *INADES-Formation* or attending its seminars.

From Table 11 we can derive two cost functions for *INADES-Formation* Cameroon:

$$TC_c = AC(N)_c + F_c$$

and

$$TC_s = AC(N)_s + F_s$$

where TC is the total cost, AC is the average cost, N_c is the number of correspondence students, F_c are the fixed costs attributable to correspondence students, N_s is the number of students attending sessions, F_s are the fixed costs attributable to visits and seminars. On the assumption that *INADES-Formation* Cameroon taught 573 correspondence students in 1978/79 we derive as the cost function for *INADES-Formation* Cameroon (in 1979 US $$)

$$128\ 462 = 97.16\ (573) + 72\ 791$$

With 573 enrolments we therefore have an annual total cost per participant of $224.19.

In 1978/9 *INADES-Formation*'s report shows that 588 people attended seminars for a total of 2 287 person/days. The figure is almost certainly an under-estimate: the *INADES-Formation* Cameroon report explains: 'Branches are not always able to complete accurately the monthly activity report. Important details such as the number of participants, the length of the seminar ... etc. are sometimes omitted' (*INADES-Formation*, 1979, p.9). We therefore assume that *INADES-Formation* Cameroon taught people in face-to-face seminars for at least 3 000 person/days. This gives us the following cost function (in 1979 US $$):

$$176\ 546 = 20.19\ (3\ 000) + 115\ 989$$

With 3 000 person/days, the total cost per person/day is therefore $58.85, a relatively high figure which reflects *INADES-Formation* staffing costs.

If we assume that each participant needs to attend two days of seminars a year, then the teaching cost per person is $224.19 + 2(58.85) or $341.89.

INADES-Formation's fixed costs are high in relation to its enrolments which suggests that there are potential economies of scale. If, for example, *INADES-Formation* Cameroon increased its enrolments to 1 000 a year the cost per participant would fall to $170, while at 1 500 the cost would fall to $146. As *INADES-Formation* Rwanda, with a much smaller staff than *INADES-Formation* Cameroon, recruited almost twice as many students in 1978/9 and marked nearly twice as many assignments, it may be that there is scope for *INADES-Formation* Cameroon to increase the number of students it reaches, if it wishes to do so.

It is impossible to make any ready comparisons between *INADES-Formation*'s costs and those of other organisations: there is no obvious point of comparison. But we thought it worth comparing the cost of working through *INADES-Formation*'s courses for two years with the cost of a one-year residential course at the centres for agricultural training which exist and are being established in the north of Cameroon. At the end of the one-year residential course, or after following *INADES-Formation*'s two agricultural courses

TABLE 11 : Annual costs of running *INADES-Formation* in Cameroon

	Total		Attribute to correspondence work a/		Attribute to other activities	
	'000 CFA	US $$	'000 CFA	US $$	'000 CFA	US $$
Fixed costs - Ivory Coast b/						
Buildings, fittings, equipment	1 906	8 906	953	4 453	953	4 453
Salaries	11 463	53 565	5 732	26 783	5 731	26 782
Travel c/	656	3 066	328	1 533	328	1 533
Other charges	3 259	15 229	1 630	7 615	1 629	7 614
Fixed costs - Cameroon						
Buildings, fittings, equipment	8 922	41 692	2 677	12 508	6 245	29 184
Vehicle	192	897	58	271	134	626
Salaries d/	10 578	49 430	3 173	14 829	7 405	34 601
Miscellaneous office costs	3 423	15 995	1 027	4 799	2 396	11 196
Total fixed costs	40 399	188 780	15 578	72 791	24 821	115 989
Variable costs - Ivory Coast						
Printing e/	1 755	8 200	1 123	5 248	632	2 952
Variable costs - Cameroon						
Salaries d/	19 644	91 794	9 066	42 364	10 578	49 430
Travel and transport	7 109	33 220	3 555	16 610	3 554	16 610
Total variable costs	28 508	133 214	13 744	64 222	14 764	68 992
less sales and enrolments f/	3 635	16 986	1 830	8 551	1 805	8 435
Net total variable costs	24 873	116 228	11 914	55 671	12 959	60 557
Net total costs	65 272	305 008	27 492	128 462	37 780	176 546

Source: Tables 7,8,9

notes:

a. We are here taking 50% of the Ivory Coast costs and 30% of the Cameroon costs.
b. These costs are 12% of those shown in Tables 8 and 9.
c. Ivory Coast travel costs arise from course authors' needs to discover how well their courses are working and their costs are not therefore a function of the enrolments.
d. We assume that the 30% of salaries attributed to correspondence students are a function of enrolments but that half of the balance should be regarded as fixed.
e. This represents 64% of the total printing cost attributable to Cameroon and therefore excludes *Agripromo*.
f. We attribute the enrolment income to correspondence students and the sales income to other activities.

(A1 and A2), which will take about two years, students are eligible to obtain agricultural credit from the government-backed credit agency. The estimated costs of a centre for agricultural training are given in Table 12.

TABLE 12 : Cost of centre for agricultural training

	Capital cost '000 CFA	Annual cost '000 CFA		US $$
Capital				
Accommodation for students	50 000	4 486 a/		
Accommodation for staff	20 000	1 794		
Other buildings	9 000	807		
Vehicle	3 000	1 154 b/		
Furniture, fittings, materials	8 000	1 165 c/	9 406	43 953
Recurrent				
General running costs		2 500		
Salaries		3 250	5 750	26 869
Total annual cost			15 156	70 822

Source: Discussion, Ministry of Agriculture, Yaounde, November 1980.

notes:
a. amortised over 25 years at 7.5%
b. amortised over 3 years at 7.5%
c. amortised over 10 years at 7.5%

Each centre takes 25 couples for a one-year course so that the cost per couple is of the order of $2 833. In discussions with *INADES-Formation* it became clear that husband and wife benefited from their courses, so we may perhaps legitimately argue that wives of *INADES-Formation* participants can be compared with the wives of the men chosen to attend centre courses. In that case the cost of *INADES-Formation* courses for two years, including attendance at seminars, is of the order of $644, or rather less than a quarter of the cost of attending a centre. We return to these costs, and comparisons, in our last section.

NOTE

We looked at the proportion of students in the sample in any one year who were continuing to work on that course in a subsequent year, with the following results.

	Total	Working in subsequent years	Still working two years later
Enrolment 1978	45	21	13
Enrolment 1979	72	51	n/a
Total	117	73	n/a
	100%	62%	

If we assume then that, as with the 1978 students, 29% will continue into a third year, we can estimate the number of students being taught at some time in 1978/79 as:

Enrolments in 1978/79	573
62% of 1977/78 enrolments (62% x 421)	261
29% of GUESSED 1976/77 enrolments (29% of 350)	102
	936

While it is probably true, therefore, that *INADES-Formation* taught between 900 and 1 000 students in that year, the figure is misleading. For we must assume that the average student enrolled in the whole period 1978/79 in fact worked only for 6 months of that year; similarly we can assume that of those who continued into a second year, the average student completed his work in 18 months and those who continued into a third year did so in 30 months. If we therefore assume that the number of students working through the whole year was 6/12 (573) + 18/24 (261) + 30/36 (102), we get a figure of 567 students, which is remarkably close to the figure of 573 for new enrolments in 1978/79.

6 : CONCLUSIONS

This study is based on a three-week visit to *INADES-Formation*, and on the existing literature about it. This limits the conclusions we can reach about its work; we have not, for example, been able to reach firm conclusions about the effects of *INADES-Formation* on the adoption of innovations, or on agricultural productivity, in the absence of research on these questions. But some conclusions are possible.

1. As far as the evidence does, *INADES-Formation* is effective in teaching farmers and extension agents. We have quoted the evidence of our eyes, and of what *INADES-Formation* students told us about its value for their work. Students registered on the agricultural courses work more consistently and persistently than many correspondence students, in many different kinds of institutions, in other countries. The studies that have been made of *INADES-Formation* students show that they do learn from their courses. Our evidence on change of practice is scanty, but all positive.

It is not easy to make comparisons between *INADES-Formation*'s work and that of other agencies concerned with the education of farmers. But it is clear, both from an examination of course materials, and from our discussions with students and staff, that *INADES-Formation*'s aims are very much broader than those of much traditional agricultural extension: *INADES-Formation* wants to educate farmers, rather than merely to instruct them. Its courses aim at teaching general principles of agriculture, which can be applied to a variety of crops and a range of conditions, as well as the specific details of how to cultivate individual crops. Our interviews with *INADES-Formation* students indicated that many had acquired such understanding. It is reasonable to assume that such education may have a long-term effect.

2. *INADES-Formation* does appear to be reaching some of the poorer farmers. It is not reaching the poorest and least educated - and by definition cannot reach those who are not literate. (Groups with one literate and several non-literate members, once hailed as a major achievement by *INADES-Formation*, are now rare.) And *INADES-Formation* has not found a way of reaching women farmers, although some women are learning farming techniques from their husbands who are enrolled with *INADES-Formation*.

3. In assessing *INADES-Formation*'s work, or considering its relevance to other countries, it is necessary to consider the relation between it and the state. *INADES-Formation*'s links with the church have given it a freedom to operate which few purely secular organisations have been able to achieve. At the same time there have, at least in some areas, been suspicions of *INADES-Formation* because it has been seen as a church organisation. Thus, while internationally *INADES-Formation* has a clear status, the relations between *INADES-Formation* in Cameroon and the state are less clear; they also appear, inevitably, to be changing subtly as the organisation becomes one that is staffed more and more by laymen who are Cameroonian nationals.

A consequence of this complex set of relations is that *INADES-Formation* Cameroon is, in some areas, working closely with government or parastatal bodies, and even taking over functions in extension training which, in other countries, are regarded as a function of government. Its seminars, for example, are parallel to and comparable with those run by government agencies. Its training of extension agents brings it into close co-operation with parastatal bodies like SODECOTON. But it does not use government channels to promote its own work and appears to be at its most active in areas where it enjoys close local support from the church or from mission centres.

4. *INADES-Formation* is teaching both farmers and extension agents, and using some of the same course material for both groups. This has some advantages:

the training of extension agents in Cameroon is so limited that both groups need to learn the same kind of things. But the courses may need a slightly different orientation for the two groups and, in the last few years, *INADES-Formation* has introduced question sheets specifically for agricultural extension agents which accompany their booklets. They are intended to show how to apply the lessons of the booklets to the process of extension work. But *INADES-Formation* seems to remain unclear about the extent to which it should be teaching extension agents and the extent to which it should be teaching farmers directly. *INADES-Formation* staff in Abidjan stressed to us the importance of maintaining their courses for farmers - partly in order to keep them in touch with peasant farmers' needs and partly because of possible conflicts of interest between *INADES-Formation* and government or parastatal agencies, who may be pressing for the extension of cash-crop farming against the interests of peasant farmers as *INADES-Formation* sees them.

5. *INADES-Formation*'s status, its ambivalence about whether courses are for farmers or for extension agents, and its determination to provide considerable and expensive field support for its students, have limited the number of students it is teaching each year. It has not sought to maximise its number of students. To some extent this is a consequence of its status: without becoming a state organisation, it probably could not use state channels to recruit students. And, while *INADES-Formation* in Yaoundé contributes to a weekly radio programme, *INADES-Formation* generally has made almost no use of radio. Without radio, it has used the mass medium of print without developing a mechanism for reaching mass audiences. It has therefore taught, we believe effectively, a small number of farmers and agents in comparison with the total agricultural population. (There are interesting contrasts here with the radiophonic schools of Latin America, where the use of radio and of volunteer group leaders has enabled the schools to achieve dramatic economies of scale, and teach very much larger numbers.)

6. Finally, the cost per student, at some $342 p.a., reflects these limits which *INADES-Formation* has set to its own development. The figure looks, at first sight, very high - especially in contrast with, for example, radiophonic schools, which appear to spend between $20 and $65 per student. Of course we are not comparing like exactly with like. The figure needs to be seen in the light of *INADES-Formation*'s decision not to seek the largest possible audience for its students; it is certainly higher than it could be if *INADES-Formation* changed some of its policy decisions. (The point here is not to suggest that *INADES-Formation*'s decisions are wrong, but to generalise about the cost of distance teaching under different conditions.) At the same time, even at that figure, it seems that *INADES-Formation* can teach farmers more cheaply than other methods of offering them a training as thorough and detailed. Where *INADES-Formation* is teaching extension agents, and taking the place of a professional training, the costs must be seen against the benefits that may accrue, indirectly, to the farmers to whom the extension agent passes on what he has learned. *INADES-Formation* may well be a highly cost-effective way of teaching extension agents. Its costs are also high because of the quality of the support services it offers to correspondence students, which to some extent may be duplicating the work of government agencies.

To sum up, then, the educational work of *INADES-Formation* is impressive. It succeeds in the, at first unlikely, task of teaching peasant farmers agricultural methods by correspondence. Correspondence teaching can lend itself to economies of scale but, for deliberate policy reasons, *INADES-Formation* has not vigorously sought those economies. Rather, it has provided a very high quality of education, with a great deal of support for correspondence students, at a cost which compares favourably, as far as we can judge, with a face-to-face, residential, alternative, but unfavourably with some other rural correspondence programmes, notably in Latin America.

APPENDIX 1 : THE ACTIVITIES OF INADES-FORMATION
(INADES, 1979, pp. 8-13, our translation)

1. Correspondence courses in agriculture (see section 3).

2. Training for rural community development. The first training programme in rural community development was designed in 1969 under the title Women in villages today. It aimed at the training of village women through the mediation of women monitors and community development workers in the field.

It consists of ten booklets; each booklet deals with one of the normal activities of women or an aspect of family life (the market, using money, preparing a meal, farming, married life, pets).

Plans for meetings are presented of a kind where women can recognise their lives and discover the means to improve them. Each booklet is accompanied by a commentary which is essential for the preparation of the meeting. The illustrations are reproduced on large pieces of card, with a view to group use.

The method is thus centred round consciousness-raising meetings. Using the same methods, but enriched by experience and with a more global perspective, a new series of seven booklets for training in rural community development is at present in preparation. This training is aimed directly at everyone who works in a rural environment and who is interested in its development. It suggests a plan of action which aims to get the active participation of rural people in their development.

This training for rural community development is in the form of dialogue: each book leads up to the development worker submitting a report which requires him or her to think about his experience. The course is supplemented by seminars and by visits.

3. Seminars. This means of training has been used right from the beginning to complement the teaching by correspondence. Its importance is always growing, there is so much demand. However, a significant role of seminars is to reach a larger public than enrolled students, although still among farmers and development agents.

The role of seminars is threefold:

- to gather together students to help them relate the teaching in the course to their own experience;
- to gather together a group (whether the members are students or not) which wants training on a particular point or wants to deal with specific problems of the region or of the group;
- to bring about a meeting and collaboration between those who share the responsibility for rural development in the region, whether they belong to official organisations or to private ones.

These seminars, which last from two to six days, take place as near as possible to the homes of those who participate in them, so as not to take people away from their locality and their preoccupations. The teaching method used brings about the greatest possible participation of those attending the seminar: work in groups, discussions, role play, etc. *INADES-Formation* considers it very important that participants can have a chance to express their practical know-how and their experience. These seminars represent a method for analysing the problems of the rural world. They allow people to organise the information they gather, which results in the possibility of practical action. As a result, the methodology of the seminars has as much importance as the content of the programme.

The subjects are always the results of a particular demand and are not part of a programme planned by *INADES-Formation*. Preliminary negotiation takes place between *INADES-Formation* and the group or the organisation which has requested the seminar to decide on the theme, the objectives and the teaching method to adopt. Among recent themes are: the transition from

traditional to modern systems of land use, farming techniques, groups, training for community development, teaching of extension work, the use of money.

4. The journal *Agripromo*. This is a quarterly review started by *INADES-Formation* in 1973. It is aimed at extension agents, at farmers themselves and at all those who are interested in and work towards the development of the rural world.

Each issue has a theme and invites the reader to reflect on an aspect of life in rural Africa and on the changes which are taking place there today, shifting away from tradition. Various themes have already been covered: health, the conflict between young and old people, the exodus from the countryside, the use of money, machines in the village, small-scale animal farming, relations between farmers and development agents, childrens' education in a rural environment.

Agripromo is also intended to be a tool for educators. Instructions suggest ways of creating awareness leading to action (group work cards, comic strips) and present to farmers simple techniques (technical advice cards).

The journal also aims to reduce the isolation of rural development workers. It invites them, particularly in the letters column, to confront their experiences and present them to other people, thus profiting from the substantial network of *INADES-Formation*. Like the other materials produced by *INADES-Formation*, *Agripromo* is written in simple French which can be understood by those who have completed primary studies.

Since the beginning of 1979, *INADES-Formation* has published in Burundi a periodical in the Kirundi language, which is based on the themes and articles which have appeared in *Agripromo*.

5. The introduction to development course. The introduction to development course is a revised version of a course prepared by INADES in 1962. The course is aimed at all those who want to acquire a general view of the problems of African development: people working in rural development, in government administration, in private enterprise; teachers; the officials of societies, those in charge of students and young officials.

The course has three objectives:

- to give an introduction to development economics; economic facts, the workings of the economy, economic theories and current controversies on strategies of development;
- to place the problems of economic development in the context of changing society: political, economic, social and cultural changes;
- to deal particularly with African development, which has its own characteristics: Africa has a past, resources, and culture different from those of other continents.

The course of study extends over two series of nine booklets:

- the first series, mainly sociology and history, is called Changing Africa. It is about the evolution of Africa and changes taking place today.
- the second series, mainly about economics, is called The Dynamics of Development. It looks at the different areas of action for development, as well as at the institutions and structures involved in this action.

This training by correspondence is supplemented by seminars.

6. Other programmes

6.1 Literacy and numeracy. The agriculture booklets are used for literacy work in several countries where *INADES-Formation* has links with UNESCO and those responsible for adult education.

INADES-Formation has also published a method of literacy and numeracy

work (three booklets designed as a guide for monitors).
6.2 Experience of writing simple French has led to the production of a booklet Introduction to Basic French, so that those working in the field can share this experience.
6.3 In response to a number of requests, *INADES-Formation* has produced documents on agriculture relating to particular development projects in several countries.
6.4 UNICEF has commissioned *INADES-Formation* to produce an annotated bibliography of documents and teaching materials in the areas of health, hygiene, literacy and community development (produced in collaboration with *INADES-Documentation*), and as well two booklets on water and health (in collaboration with the National Institute of Public Health in the Ivory Coast).
6.5 A book on the countries and products of Africa, Economic Africa, has been revised, in 1978, with the assistance of the French Cultural and Technical Co-operation Agency.
6.6 Finally, in response to demand from public or private organisations, *INADES-Formation* helps in the evaluation of development projects and of rural training.

Training organisations consult *INADES-Formation* and ask it to take part in the construction of training programmes: the subject matter, curriculum, and teaching methods.

APPENDIX 2 : INADES-FORMATION'S NATIONAL OFFICES

BURUNDI	-	INADES-Formation, BP 2520, Bujumbura
CAMEROON	-	INADES-Formation, BP 11, Yaoundé
CHAD	-	INADES-Formation, BP 945, N'Djamena
ETHIOPIA	-	AGRI-SERVICE-ETHIOPIA, P O Box 2460, Addis Ababa
IVORY COAST	-	INADES-Formation, 08 BP 08, Abidjan 08
KENYA	-	INADES-Formation, P O Box 14022, Nairobi
RWANDA	-	INADES-Formation, BP 866, Kigali
TOGO	-	INADES-Formation, BP 9, Dapaon
UPPER VOLTA	-	INADES-Formation, BP 1022, Ouagadougou
ZAIRE	-	INADES-Formation, BP 5717, Kinshasa

APPENDIX 3 : INADES-FORMATION BOOKLET TITLES

Year 1 : General Agriculture and Animal Husbandry

0 Introduction (1977)
1 How to choose your field (1976)
2 How to prepare your field (1976)
3 How to work the land (1977)
4 How to sow (1977)
5 How to cultivate your growing crops (1977)
6 How to protect the plants (1977)
7 How to harvest (1977)
8 Feeding and sheltering animals (1978)
9 Diseases and reproduction of animals (1978)

Year 2 : The Farmer's Products

The farmer's calculation book (1979)
Groundnuts (1974)
Fruit trees (1977)
The banana (1980)*
Cocoa (1980)
Coffee (1979)
Market gardening 1 (1975)
Market gardening 2 (1975)
Rubber (1975)
Maize (Cameroon)
Millet and sorghum (Cameroon)
The oil palm (Cameroon)
Grazing and fodder (1973)
Roots and tubers (1976)
Paddy rice (1980)
Upland rice (1978)
Soya (1975)
Tobacco (1977)
Cotton (1980)*
Cattle (1976)
Sheep and goats (1976)
Pigs (1976)
Poultry (1978)
Fish farming (1978)
Rabbits (Cameroon)
Oxen farming (1977)

Notes: The date is of the latest revised edition. An asterisk indicates new editions in press in November 1980. The volumes printed locally in Cameroon are undated.

APPENDIX 4 : THE COSTS OF INADES-FORMATION IN RWANDA

The *INADES-Formation* office in Rwanda devotes far more of its time and resources to correspondence teaching than the one in Cameroon. Abidjan staff estimate that 80% of the Rwanda costs can be attributed to correspondence work. They enrol more correspondence students than the Cameroon office and employ fewer staff. We have therefore done a rough calculation of Rwanda's costs on similar assumptions to those for Cameroon. The basic facts are set out in Table A1.

TABLE A1 : Costs of correspondence education in Rwanda

	'000 CFA	US $$
Ivory Coast		
Capital and recurrent a/	12 967	60 593
Printing b/	281	1 313
Rwanda		
Building c/	1 302	6 084
Furniture and fittings d/	529	2 472
Recurrent e/	6 410	29 953
Translating and printing f/	1 624	7 589
	23 113	108 004
less enrolment income g/	3 242	15 150
	19 871	92 854

notes:

a. We have attributed 11.5% of the costs to Rwanda on the same formula as was used for Cameroon.

b. Rwanda does most of its own printing, so we have attributed to it only 3% of the Ivory Coast correspondence course printing costs.

c. This is 80% of 18 150 000 CFA, the cost of the building erected in 1978/79, amortised over 25 years at a 7.5% interest rate.

d. 80% of the cost estimate of 3 500 000 CFA, amortised over 7 years.

e. 80% of the recurrent expenditure in the Rwanda annual accounts.

f. In 1978/79 2 190 425 CFA was spent on translations and printing, but we assume that this should not be taken to represent work attributable to that year alone. We have therefore amortised this figure over 5 years, but multiplied the result by 3 to allow for translations and printing done in the previous two years.

g. We have no actual figure for enrolment income so have assumed the income can be estimated *pro rata* from the Cameroon figure.

If we regard as fixed all the Ivory Coast costs, the capital costs in Rwanda and half the recurrent costs there, and take as variable the other half of the Rwanda recurrent costs and the Rwanda printing costs, we can then derive the following:

		'000 CFA	US $$
Fixed costs		18 284	85 439
Variable costs	4 829		
less fees	3 242	1 587	7 415
Total		19 871	92 854

In 1978/79 Rwanda had 1 010 students, so we can now derive the cost function for correspondence students:

$$TC_c = AC(N)_c + F_c$$

US \$92 854 = 7.34(1010) + 85 439

With 1 010 students we therefore have an annual cost per participant of \$91.93.

The fixed costs for Rwanda are therefore very similar to those for Cameroon, while the variable costs are far lower. (As this study is based on more limited information than the Cameroon one, it is possible that we have allocated costs slightly differently between fixed and variable.) More important, the total cost per participant is strikingly lower than in Cameroon.

Rwanda is relatively small and densely populated, which presumably makes it easier for *INADES-Formation* to work there and to serve a larger number of students per staff member. Nevertheless, the difference between the Rwanda and Cameroon figures does confirm that there could be economies of scale and that the *INADES-Formation* system can operate at a lower cost than achieved in Cameroon. Without a more detailed study we cannot, of course, compare the effectiveness of what is done in the two countries. One small indicator suggests that there is little difference between them. If we divide the number of assignments submitted in a year by the number of new enrolments, we get a crude measure of students' assiduity. Over four years the results are:

	Rwanda			Cameroon		
	a new enrolments	b worksheets marked	a/b	a new enrolments	b worksheets marked	a/b
1976	705	5 675	8.05	489	2 699	5.52
1977	1 027	6 136	5.97	292	3 042	10.42
1977-8	1 117	7 326	6.56	421	3 081	7.32
1978-9	1 010	7 010	6.95	573	3 801	6.63
Average (76-9)			6.78			7.11

The figures suggest that, despite the economies achieved in Rwanda, the correspondence teaching there may be similar in effect to that in Cameroon.

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PART V

THE LESOTHO DISTANCE TEACHING CENTRE

Laurence Wolff

Table of Contents

		Page No.
BASIC DATA		251
SUMMARY		253
I.	SOCIO-ECONOMIC BACKGROUND	254
II.	NON-FORMAL EDUCATION IN LESOTHO	256
III.	THE LESOTHO DISTANCE TEACHING CENTRE (LDTC)	262
	Background	262
	Income and Expenditures	262
	The Correspondence College Program	266
	Programs to strengthen basic literacy and numeracy	266
	Programs to provide practical information to adults	270
	Radio programs for adults	272
	The research department	281
	Programs to assist other non-formal education agencies	281
IV.	EVALUATION OF THE LDTC	283

KINGDOM OF LESOTHO

BASIC DATA (1979)

Population	1,300,000
Population growth rate	2.3% p.a.
GNP per capita	US$340
GDP per capita	US$200
Literacy rate	50%
Primary education	
Enrollment	235,000
As a percentage of school age population (including overaged children)	101.4%
Junior secondary education	
Enrollment	18,200
As a percentage of school age population	21.0%
Senior secondary education	
Enrollment	3,200
As a percentage of [illegible] age population	6.0%
Higher education	
Enrollment	1,050
As a percentage of school age population	0.9%

CURRENCY EQUIVALENTS (1979)

US$1 = Maloti (M) 0.7747

M 1 = US$1.2908

M 1 = RSA Rand (R) 1

ABBREVIATIONS

AIS	=	Agriculture Information Service of the Ministry of Agriculture
IEMS	=	Institute of Extra-mural Studies of the University of Lesotho
LDTC	=	Lesotho Distance Teaching Center
NTTC	=	National Teacher Training College

The Country	=	Lesotho
The People	=	Basotho
The Language	=	Sesotho

SUMMARY

This paper discusses the work of the Lesotho Distance Teaching Centre which, at the time of writing, was a semi-government agency concerned with both formal and nonformal education throughout Lesotho. The work of the Centre is discussed in the context of Lesotho's geography, as a landlocked and poor mountainous country, and of its educational system, with its relatively high literacy rate and variety of adult education agencies.

The Lesotho Distance Teaching Centre was established, with support from the International Extension College, in 1974. It has four functions: to provide correspondence education, mainly at secondary level, both for individual students and for trainee teachers; to teach practical skills to rural people; to help other agencies working in nonformal education; and to promote basic literacy among rural youth and adults.

The Centre has experimented with a number of different approaches to these tasks including developing and distributing self-learning materials, providing educational games, and publishing educational inserts for the widely distributed church newspapers of Lesotho. It has also published and distributed a range of short printed pamphlets designed to help rural adults acquire skills which will improve their economic and social well-being.

The paper discusses in some detail one such pamphlet, on how to crochet, on the basis of an evaluation carried out at the Centre in 1977. The pamphlet was provided both to individuals and to groups; net production and distribution costs amounted to about M0,50 (US$0.65) per copy. In the light of evidence about the extent to which people learned to crochet, or learned to crochet better, as a result of using the pamphlet, and of the costs of local crocheted goods, the analysis suggests that the project had both a high individual rate of return for buyers of pamphlets and a high social rate of return.

The paper discusses briefly the Centre's work in radio and the work of its research section. It concludes by attributing its comparative success to its autonomy, to its dedication to its mandate of improving the life of rural people, and to its willingness to engage in self-criticism.

I. SOCIO-ECONOMIC BACKGROUND

1.01 Lesotho is a small, poor landlocked country of about 30,000 km2. Its population is estimated at 1.3 million and is growing at over 2 percent per year. With a GNP per capita of US$340 in 1979, Lesotho is among the poorest countries in the world. The nation was established in 1857 by King Moshoeshoe the Great, who fought against the encroachments of white settlers and gave the Basotho people a strong sense of historical identity. The Basotho stretch along a wide area of South Africa and have a common language (Sesotho) and culture.

1.02 Lesotho is completely surrounded by the Republic of South Africa, upon which it is economically dependent. Over two-thirds of the country is mountainous, with peaks rising to over 3,000 meters. A narrow crescent of fertile land contains most of the 1.3 million population. Few roads lead into the mountain regions, and the people of these regions are isolated physically from the rest of the country. About 9% of the country's population is urban, of which half is located in the Maseru area.

1.03 Lesotho's economy is strongly influenced by its unique geopolitical situation. It depends on South Africa for 90% of its merchandise trade and and for employment of one half of its male labor force. Migrant labor remittances are equivalent to 60% of the country's GNP. These economic links are reinforced by the country's membership in the Southern African Customs Union, which provides 70% of government revenue from a common pool of customs duties, excise duties, and sales taxes.

1.04 The known possibilities for economic development in Lesotho are limited. Agriculture accounts for less than 20% of GNP and has been declining in recent

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This report is based on a visit to Lesotho in September, 1980. The author wishes to thank all LDTC staff, especially Mr. T. Shale, acting director at the time of the visit, and Mr. T. Derkx, Projects Coordinator, for their cooperation and kind assistance.

years. South African agriculture is more efficient than that of Lesotho and opportunities in Lesotho for improved productivity through mechanization are limited. Despite the recent decline, there is still scope for expanding production of some high value crops and for increasing output modestly. Aside from agriculture, Lesotho's handicrafts industry, which specializes in rugs, sweaters, pottery, and jewelery, as well as simple assembly industries, could be expanded significantly. While Lesotho has lower wage rates than South Africa, it is handicapped by manpower shortages, especially in skilled and semi-skilled crafts and in business management.

1.05 Enrollments in primary education in Lesotho are high, equivalent to 122% of the female population and 82% of the male population (including overaged children). At the secondary level enrollment is equivalent to about 17% of the school age population. However, the quality and efficiency of the system is poor. Only about 32% of entering students complete the full primary school course. Primary schools often have little or no physical facilities and little furniture, equipment or textbooks. There are also serious problems of quality at the secondary level; pass rates in the School Certificate Examination held at the end of the fifth year of secondary education were only 27% in 1979.

1.06 In spite of the weakness of its educational system, Lesotho's population is literate compared to other African countries. In 1974 about 50% of the adult population was able to read printed matter written in Sesotho. This percentage had probably increased by 1980. In addition, most of the illiterate adults had access to print material through friends or relatives who could read to them.

II. NON-FORMAL EDUCATION IN LESOTHO

2.01 Lesotho is characterized by a high literacy rate, a unique geo-political situation, lack of indigenous natural resources, and a weak formal education system. In this context, numerous non-formal education organizations have proliferated. Their goals have usually been to assist in increasing the economic and social well being of the Basotho through programs which provide practical information and education to adults. The purpose of this report is to describe and evaluate one of the most interesting and innovative of them -- the Lesotho Distance Teaching Center (LDTC). To place the LDTC in the Lesotho context, it is appropriate to summarize briefly the activities of the other major non-formal institutions.

2.02 The Institute of Extra-Mural Studies of the University of Lesotho (IEMS) carries out programs of adult education in Lesotho as an extension department of the University. IEMS organizes courses, seminars and conferences for groups such as credit unions, cooperatives, and small businessmen as well as for part-time University students. It also publishes a monthly newspaper supplement and prepares a weekly radio show. In 1980 it had about 14 professional staff. The IEMS budget in 1978-79 totalled M 185,000 (see Table 1) and is estimated at around M 250,000 in 1980. The budget includes large amounts for part-time teachers and employees, many of whom were university professors. Since IEMS professional staff are part of the University, salaries are higher than most civil service personnel and were estimated at R 7000 per staff member in 1980.

2.03 IEMS appears to be relatively successful in its part-time business and accounting programs and in training local businessmen although, like most other non-formal agencies in Lesotho, it has not systematically evaluated its

Table 1

NATIONAL UNIVERSITY OF LESOTHO

INSTITUTE OF EXTRA-MURAL STUDIES (IEMS)

BUDGET ESTIMATES 1978-79

	Amount	% of Total
Salaries and Wages		
Full-time	M 79,600	42.9
Part-time	36,500	19.7
Pensions and Gratuities	14,900	8.0
Allowances	7,300	3.9
Sub-total	138,300	74.6
Other and Miscellaneous		
Supplies	6,000	3.2
Equipment	1,100	0.6
Miscellaneous	11,500	6.2
Travel	22,800	12.3
Publications	5,700	3.1
Total	M185,400	100.0

Source: IEMS
Date: November 20, 1980

programs. The IEMS' newspaper supplement is included without additional charge in the two private church newspapers circulated throughout Lesotho and in parts of South Africa. The most recent newspaper supplement contains articles in Sesotho on the history of Lesotho, credit unions, notes for students in business studies, women's role in development, and the average miner's life in South Africa. The language is fairly sophisticated and appears to be above the reading capacity of many Basotho. The IEMS has also initiated a 30 minute radio program broadcast once a week. The main focus is on cooperatives and adult education. Both the newspaper supplement and the radio program are produced by one person and have no procedures to evaluate its impact on readers.

2.04 The Agriculture Information Service (AIS) of the Ministry of Agriculture has 17 professional staff and a budget in 1979-80 of M 257,000. During 1979-80 the AIS produced about one and a half 15-minute radio programs per day or 535 per year. The subject matter varies from appropriate farm techniques to news of the Ministry of Agriculture. A typical farm program discusses how to prune fruit trees appropriately or how to construct a litter house for poultry. The program is usually drawn from a textbook and utilizes no dramatization or dialogue. The AIS also produces a series of free leaflets, monthly magazines, and staff information bulletins aimed at individual farmers and at extension workers. In 1979 the AIS produced 19,000 leaflets, 42,000 copies of the monthly magazine, and 681 copies of the monthly bulletin. The AIS has not evaluated readership or utilization of these bulletins. The AIS recently completed a film describing the 1979 farmers conference and also produces slide

shows. Because of a reduction in funds for travel from M 20,000 to M 8,000 the AIS eliminated its traveling film shows except when transport was paid for by other agencies.

2.05 The Lesotho National Broadcasting Service, the only radio station operating in Lesotho, broadcasts at 100 kw and will shortly upgrade to 200 kw (medium-wave), which will enable it to expand coverage from two-thirds to nearly 100% of the country. The Radio Station is a part of the Ministry of Information and Broadcasting and its 1979-80 budget was M 256,000 (Table 2). The station broadcasts numerous educational programs, the contents of which are provided by government and autonomous agencies. On a typical day the National Radio Station carries the following educational programs: 6:40-7:00 a.m., "Farm Call", Ministry of Agriculture; 2:00-2:30 p.m., "School Broadcast," Ministry of Education; 5:45 p.m. and 6:15 p.m. "Broadcasts to Private Students," LDTC; 6:30 p.m., repeat of "Farm Call"; 8:15-8:45 p.m., University Lesotho, IEMS; and 9:15-9:30 p.m., "Our Health," Ministry of Health. On other days the Ministries of Cooperatives and Rural Development and of Transport, as well as the LDTC, provide additional programs. The Radio Station also broadcasts its own programs of music and news. The Radio Station is understaffed and does not have the capacity or funds to initiate listener surveys. It does not publish an up-to-date broadcast schedule; in fact the schedule appearing in the national newspaper in late 1980 was three years out of date.

2.06 The government newspaper, the Lesotho Weekly, published by the Ministry of Information and Broadcasting, has been in existence for two years and is the official organ of the government. It prints about 2,200 copies in English and 2,800 copies in Sesotho per week at ten cents per copy. It

Table 2

MINISTRY OF INFORMATION AND BROADCASTING

BUDGET 1979-1980

Information	Rands	% of Total
Salaries and Wages	87,200	66.1
Local Travel	2,750	2.1
International Travel	990	0.7
Office Administration		
Printing	23,960	18.2
Other	6,870	5.2
Subtotal	30,830	23.4
Maintenance	6,200	4.7
Furniture and Equipment	3,990	3.0
Total	162,790	100.0
Broadcasting		
Salaries and Wages	194,000	75.8
Local Travel	4,100	1.6
International Travel	13,950	5.5
Office Administration	13,200	5.2
Maintenance	24,080	9.4
Furniture and Equipment	6,460	2.5
Entertainment	100	0.0
Total	255,890	100.0

Source: Ministry of Information and Broadcasting
Date: November 20, 1980

focuses on official government news, sports, and international news and does not have a specifically educational function. Its 1979-80 budget was about M 160,000 (Table 2).

2.07 The Protestant church newspaper, Leselinyana la Lesotho, was established in 1888. It is published bi-weekly and has about 22,000 circulation, half of which is in South Africa. Another newspaper, Moeletsi ao Basotho, is a Catholic newspaper published on a weekly basis and with about 10,000 circulation, mostly in Lesotho. Both newspapers often carry articles of an educational nature and are independent of government control.

2.08 The Ministries of Health and of Cooperatives and Rural Development also have radio programs, prepare leaflets and booklets and run training programs. Numerous private agencies, such as the Lesotho Family Planning Association, the National Council of Women, UNICEF, and church and missionary groups, prepare and distribute leaflets, pamphlets and booklets and have adult education programs.

2.09 The combined budgets of the LDTC, the Ministry of Information and Broadcasting, AIS, and IEMS are more than M 1.2 million. Additional government and the numerous other small private agencies provide an additional estimated M 500,000, for a total of almost M 2 million for non-formal education (not including the two private newspapers), or nearly 1% of GDP. With the exception of the LDTC, all these agencies do very little pre-testing or evaluation of their material and there is little evidence as to whether they are achieving their goals of improving the social and economic life of the Basotho.

III. THE LESOTHO DISTANCE TEACHING CENTER

Background

3.01 The LDTC was established in February, 1974, with assistance from the International Extension College of England. Its main function at that time was to establish correspondence courses for private students at the secondary level, utilizing printed materials, pamphlets, and educational radio programs and to use similar methods for non-formal education. It now has four major functions: (a) to assist private secondary school students through its role as a correspondence college; (b) to provide practical skills to rural people through both print and radio programs; (c) to assist other agencies involved in non-formal education; and (d) to develop and strengthen basic literacy and numeracy skills in youth and adults. Since 1974 it has gradually reduced its resources devoted to the correspondence college, although this area still absorbs over 50% of the budget, and has reduced its use of radio. At the same time, it has gradually expanded its programs directed at improving the life of rural adults through the use of the print media. Because of the importance of its mission, as well as a record of some successes, the LDTC has attracted foreign technical assistance from numerous agencies, including the Irish, Dutch, American, Danish and British Governments, as well as UNICEF and the World Bank. It now employs 61 people, of whom 6 are expatriates under contract.

Income and Expenditures

3.02 Table 3 provides a breakdown of the 1979-80 LDTC budget, which was about M 230,000. After allocating the costs of administration, overhead, and production to the respective operating departments, it can be seen that 50.7% of the budget goes to the "student advice" and "course writing" departments.

Table 3

EXPENDITURES - LESOTHO DISTANCE TEACHING CENTRE
April 1, 1979 - March 31, 1980
(in Maloti)

	Total Costs		1/ Department									
	Amount	% of Grand Total	Administration	Overhead	Production	Research	Radio Service	Rural Educ.	Service Agency	Literacy/ Numeracy	Student Advise	Course Writing
ITEM												
Staff Expenses	81330	35.4	9064	3555	15333	4056	7961	10108	3715	8492	12120	6925
Program Costs	122562	53.4	3641	1253	62027	1938	4357	3125	11927	10995	21706	1591
Travel (motor vehicles)	14326	6.2	1552	1728	654	1284	886	1715	1755	1446	2878	427
Depreciation	11513	5.0	318	101	7239	101	2735	134	367	101	318	101
Total : amount	229730		14575	6637	85253	7378	15939	15083	17765	21034	37022	9044
Total : as a % of Total			6.4	2.9	37.1	3.2	6.9	6.6	7.7	9.2	16.1	3.9
Allocation of Centralized Departments												
Administration			14575	729	2186	1457	1457	1457	2915	1457	2186	729
Overhead				7366		589	589	737	3683	589	589	589
Production					87440	1032	2028	9944	9305	-	66050	-
Total After Allocation: amount	229730					10457	20014	27221	32748	23081	105847	10632
as a % of Total						4.5	8.7	11.8	14.3	10.0	46.1	4.6

1/ Office of the Director
Source: LDTC
Date: November 18, 1980

These two sections assist in upgrading primary school teachers and in aiding adults and youths who correspond by mail, and then sit for the junior certificate (or other) examination given to those who have completed junior secondary education. The "service agency" department, which assists other non-formal education agencies, accounts for 14% of the budget. The "rural education" department which prepares pamphlets and reading materials for rural adults, accounts for 12% of the budget, followed by "literacy and numeracy" (10%), which supports basic literary programs. Finally the "radio service department" (9%) provides radio programs for private candidates as well as programs of culture and information for adults.

3.03 Table 4 is a "balance sheet" of the LDTC covering both income and expenditure. About 75% of all income is in the form of grants and donations from the Government as well as from private and international agencies. 1979-80 was the first year in which the LDTC became an autonomous agency of the Ministry of Education and the government is now paying the salaries of more than half the LDTC staff. This support has enable the LDTC to increase salaries and ensure that it retains qualified staff. The remaining 25% of LDTC's income comes from sale of booklets, payment for services to other agencies, and fees paid by private candidates. The "balance sheet" shows that the LDTC is organized as a kind of private enterprise. It includes the provision of funds for depreciation of printing and radio equipment and furniture. Salaries and wages account for only one-third of LDTC's expenses. Printing accounts for an additional one-third and the remaining costs are for maintenance, materials duplication, vehicle expenses, fees, and other running expenses.

Table 4

LESOTHO DISTANCE TEACHING CENTER

RECEIPTS AND PAYMENTS, FISCAL 1979-80
(in Maloti)

Item	Debit	Credit	
Service agency income		9,932	
Formal campus income		23,671	
Sale of textbooks		4,210	
Sale of LDTC publications		7,149	
Grants and Donations		151,266	
Interest received		4,739	
Debtor's accounts		105	
Printing equipment (depreciation)	6,655		
Radio station equipment (depreciation)	210		
Furniture and fittings (depreciation)	767		
Textbooks	5,546		
Loan account	914		
Suspense account	59		
Printing materials and expenses	57,752		
Outside printers charges	15,521		
Library	45		
Motor vehicle running costs	8,086		
Research expenses	431		
Radio station expenses	2,691		
Rural education	378		
Service agency expenses	8,629		
Literacy and numeracy	5,023		
Student advice	307		
Course writing	259		
Staff salaries	75,753		
Temporary staff usages	2,184		
Staff training	2,076		
Staff refreshments	1,316		
Tutor fees	9,365		
Accomodation costs	7,514		
Repairs	469		
Advertising and public relations	1,098		
Other overhead expenses	13,084		
Deficit for the period		25,056	
Total	226,127	226,127	
Cash balance 1/4/79			60,751
Deficit			-25,056
Cash balance 3/31/80			35,695

Source: LDTC
Date: November 20, 1980

The Correspondence College Program

3.04 The Lesotho In-Service Education for Teachers Project is a highly successful activity undertaken jointly by the LDTC and the National Teacher Training College (NTTC). In 1980 over 400 primary school teachers were unrolled. The project upgrades both content and methodology of untrained teachers. The NTTC convenes monthly one day meetings of teachers as well as two three week residential courses during school vacations. During the rest of the year teachers study by correspondence. Each upgrading phase (of which there are three) lasts two years and teachers are awarded a small salary increment upon successfully completing the phase. Only about 10% of teachers drop out of each phase and more than 80% pass the final examiniation for each phase.

3.05 In addition to this program, about 400 students are enrolled in the LDTC as private candidates for the junior certificate (junior secondary) examination. For 1979 the pass rate of these students was 73% in English, 90% in Sesotho, 89% in Mathematics, and 93% in Agriculture, and 35% in Bookkeeping, compared to an average of 27% passes in the regular junior secondary schools. Detailed information on the causes of this relatively high pass rate are not available. Nonetheless, based on these results as well as reported lower unit costs than regular secondary schools, the program appears to be a highly successful activity of the LDTC.[1/]

Programs to Strengthen Basic Literacy and Numeracy

3.06 The LDTC has supported literacy and numeracy programs since 1977. At the end of 1977 a basic "literacy" package for adults was developed. It utilized a set of educational games as well as selected group leaders who were

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1/ This report focusses on the non-school programs of LDTC rather than on the school related correspondence college program.

trained for a day and paid a small honorarium. An evaluation of the program showed large numbers of dropouts and low utilization of the correspondence methodology. LDTC concluded that supervision as well as financial and human resources would have to be greatly increased in order to show good results. When the LDTC used the same materials in prisons, it had more success, because of the "captive" audience which had few alternative uses for their time. The LDTC also experimented with providing self-learning materials to primary school students as a means of strengthening the in-school learning process. These materials apparently did work as well as conventional teaching methods, but the program has not been expanded in part because the LDTC was getting involved in an area, formal primary schooling, which might involve disputes over authority. The LDTC has now embarked on a «learning post» approach to literacy, in which a local teacher or community leader distributes materials, assists learners, records activities, and acts as liaison with the LDTC. This program has just begun and has not yet been evaluated.

3.07 The LDTC is also concentrating on strengthening the reading and literacy skills of newly literate youths who have dropped out of school, as well as adults who have limited opportunity to retain their literacy skills. On this basis in 1980 the LDTC initiated a four page newspaper supplement called Moithuti ("The Learner"), which is inserted once a month in the two church-controlled newspapers. About 21,000 copies are distributed through the two weekly newspapers. Sales of the two newspapers are reported to increase during the weeks when Moithuti is inserted, although no specific information is available. Table 5 provides an estimate of costs, which are about 6.5 cents per copy.

3.08 The supplement is designed to strengthen the literacy and numeracy skills of adults and recent school dropouts as well as to provide general

Table 5

LESOTHO DISTANCE TEACHING CENTER

COST OF NEWSPAPER INSERT

"MOITHUTI"

Item		Cost
Printing - 25,000 copies		M 700
Insertion into two newspapers		150
Travel		50
Incidents		100
One man's monthly salary		455
Salary overhead (30%)		137
	Total	M1,592
Cost per copy (25,000 copies)		0.064

Source: LDTC unpublished data
Date: November 20, 1980

cultural and educational information. A typical issue contained a page one lead article on the pre-colonial history of Lesotho and an editorial urging readers to send in articles and letters. The second page contained a children's story and a set of two pictures, in which readers were asked to identify the differences between the two pictures. The third page included a story describing the typical life of migrant laborers in south Africa. Another article on "helping your neighbor" had not been punctuated; Moithuti asked its readers to punctuate the article and send it to the LDTC to receive copies of the LDTC literacy workbook. The last page article discussed how to wash mohair appropriately. It also had a cartoon story on a youth who goes to the mines, and two letters to the editor requesting increased frequency and larger size of the newspaper supplement.

3.09 The first six issues of the newspaper supplement have followed the same format. The LDTC has not yet made a formal evaluation of the newspaper supplement, and the only indirect evaluation information came from the reported increased sales of the newspapers and from a small number of letters (100 at first, but only 10-20 at present) thanking the LDTC for the supplement. Despite this lack of evaluation information, the newspaper insert appears to be an effective means of reaching large numbers of the adult population at a relatively low cost. The private newspapers provide a ready made distribution system in urban areas; however readership is reported to be very low in rural areas.

3.10 Based on review of the recent issues, it appears that the articles are prepared without a clear developmental sequence in mind. One reason for this problem is that only one staff member prepares the entire supplement. It might be appropriate for both professionals working in the "literacy and numeracy" department to prepare the newspaper supplement and to get assistance

from other LDTC staff to establish both behavioral objectives and formative evaluation mechanisms. Despite these problems, the LDTC supplement contrasts sharply with the monthly supplement recently introduced by the IEMS, which is much too complexly written for the average Basotho reader and emphasizes information about IEMS programs which have limited interest for those who are not enrolled in their progams.

3.11 Based on the information received on sales, the LDTC might propose that the two private newspaper increase their prices 5 cents when the insert is included. This would be a source of additional revenue to the LDTC and a good evalution of interest in the supplement.

Programs to Provide Practical Information to Adults

3.12 The purpose of the "basic rural education" department is to provide practical information to rural adults which will enable them to improve their economic and social well-being. In practice, this department has met this objective through the preparation of booklets on crocheting, cookery, first aid, vegetable growing, child care, and expecting a baby. These booklets are sold at 10 cents per copy, with the exception of "Child Care," at 20 cents, and Expecting a Baby", at 15 cents.

3.13 Table 6 shows that in 1979 the LDTC sold about 18,000 booklets. The best seller was "Expecting a Baby," which sold 7,500 copies, followed by "First Aid," "Cooking," Vegetable Growing," "Crochet," and "Child Care." Since the booklets are usually sold at wholesale at 8 cents per copy for a 10 cents book, the total receipts to the LDTC were only M 1,807 in 1979. Since the cost of printing the booklets is about 16 cents for 32 pages (plus the cost of booklet development), the LDTC takes a significant loss on each book. Nevertheless, by charging a small amount, LDTC provides an incentive to

Table 6

LESOTHO DISTANCE TEACHING CENTER

NUMBER AND PRICE OF BOOKLETS SOLD - 1979

(est.)

Booklet Subject	Number Sold	Retail Price Per Copy	Retail Price Total	Wholesale Price Per Copy	Wholesale Price Total
Crochet	1,160	10 cs	M 116	8 cs	M 92.80
Cookery	2,580	10 cs	258	8 cs	206.40
First Aid	3,360	10 cs	336	8 cs	268.80
Vegetable Growing	2,270	10 cs	227	8 cs	181.80
Child Care	980	20 cs	198	10 cs	156.80
Expecting a Baby	7,510	15 cs	1,126.50	12 cs	901.20
TOTAL	17,860		M2,161.50		M1,807.60

Source: LDTC Estimates
Date: November 20, 1980

booksellers and has some assurance that its readers consider their investment of value.

3.14 In 1975-76 the LDTC realized it had very limited resources to provide adults with practical information. In order to reach the largest number of people with its limited staff and funds, the LDTC decided to initiate research on the use of the printed word in Lesotho. In 1975 and 1976 a series of base line studies showed that the adult literacy rate was about 50% and three-quarters of the illiterates had a friend or relative who could read to them. Another study found that Basotho adults had difficulty understanding photographs and line drawings, which had to be kept very simple and carefully pretested.

3.15 After these studies were completed, the LDTC asked a sample of adults which information they needed to improve their life. The survey showed that the greatest interest was in home safety, preparing food for infants, home decoration, spinning and weaving, crop storage, marriage law, helping children with homework, and growing peas and beans. With this information LDTC initiated its booklet program.

3.16 In 1976, the LDTC evaluated the "Cookery" booklet. It found that a large minority (40%) of purchasers had never tried any of the recipes, possibly because many of the recipes were for donated goods which were not in the Basotho's normal diet. A similar study of the first aid booklet also showed that most people did not read the booklet. However, since the booklet was for use in emergencies, it could be considered useful if only a few persons used it when needed.

3.17 In 1977 the LDTC evaluated the "How to Crochet" booklet. Since this booklet taught a specific skill, it could be more easily and clearly evaluated

than the "Cookery" and "First Aid" booklets. The LDTC found that 90% of those who bought the booklet had read it. It also found that two-thirds of the booklet readers already knew how to crochet. Apparently these readers were hoping to review and improve their methodology. Of those who read the booklet and did not know how to crochet, about half learned to crochet according to the booklet's instructions. Among those who aready knew how to crochet, about forty percent changed their method of crocheting in accordance with the booklet's instructions. Overall, 24% of all booklet buyers learned to crochet according to the booklet's instructions. Another 25% learned something from the booklet, since they could do some of the crocheting exercises. Learning groups which were organized by the LDTC and led by a trained coordinator learned at a higher rate (two-thirds learners) than those who bought the books directly and did not work with a group.

3.18 The study therefore provides a very positive and encouraging account of the value of a learning booklet. Unfortunately, the study provides no information on whether learners actually did crochet simple things such as woolen hats, which are necessary for Lesotho's cold winter climate and which cost about M 2.00 in the local market.

3.19 Table 7 provides 1980-81 estimates of the cost of producing the booklet on crochet or similar booklets. The total development costs are about M 3,700 including researching, testing, printing, and photocopying. The cost of printing and distribution of 13,500 copies over a two-year period is M 4,700 for a total cost of M 8,400, or 62 cents per copy. After substracting about M 1,700, which is the expected income to the LDTC for selling the booklets (at a new price of 15 cents retail), the total net cost to produce 13,500 copies of the booklet is

Table 7

LESOTHO DISTANCE TEACHING CENTER

CROCHET BOOKLET

ESTIMATED DEVELOPMENT, PRODUCTION AND DISTRIBUTION COSTS AND SALES INCOME, 1980-81

Item	Duration or Unit	Cost per Man Month or per Unit	Total Cost
Development Costs			
1. Preliminary Research	1 month	M 483	M 483
2. Writer-Editor	3 months	525	1,575
3. Typing	1 month	193	193
4. Artist illustrations	2 weeks	314	157
5. Printing, pre-tests and drafts	2 days	400	40
6. Researcher	3 days	520	78
7. Field Worker	4 days	275	55
8. Center senior staff	1 week	660	165
Subtotal			M2,746
Overhead (30%)			824
Total Salaries			M3,570
9. Photocopies	1000 copies	8c per copy	80
		4c overhead per copy	40
10. Travel	150 kms	25c per km	38
Total Development Cost			M3,728
Printing Costs			
Total Printing Costs	13,500 copies of 32-page booklet	16c per copy	M2,160
Distribution Costs (two years)			
1. Distribution officer salary	6 months	M265 per month	1,554
Overhead (30%)			648
2. Per diem allowance	126 days	M2.50 per month	52
3. Travel	6000 km	M25 per km/6	250
Total Distribution Costs			M2,504
TOTAL COSTS			M8,392
Sales			
1. Copies sold to individuals	6500	15c per copy 1/	975
2. Copies sold to dealers	6500	12c per copy	780
3. Less 10% bad debts		12c per copy	- 78
Total Income			M1,677
TOTAL NET COSTS			M6,745
Net cost per booklet			0.50

1/ Proposed new price

Source: LDTC unpublished estimates
Date: November 20, 1980

M 6,700, or 50 cents per booklet. The sale of the booklets covers only 20% of the LDTC's total booklet costs.

3.20 LDTC staff have estimated that (a) a crochet hook costs about 40 cents and lasts for about 20 hats before getting lost or torn; (b) there is no opportunity cost for a beginner's lost time, since the alternative might be spent in chatting, or meeting with other women; (c) the article of clothing which a beginner would be most capable of making would be a crocheted baby hat, which would take about ten hours of work for a beginner; and (d) a crocheted baby hat would cost about M 2.00 in the local market. Based on this information, we can see that even if a woman crochets one hat she would benefit from purchase of the booklet, since the retail cost of a crocheted hat is M 2.00 while her costs would be 15 cents for wool, 40 cents for a hook, and 15 cents for the booklet or a total of 70 cents. In economic terms she would have a high "private rate of return."

3.21 Table 8 estimates the "social rate of return," or net benefit to society, for the booklet. Based on the fact that each booklet has a net cost of 50 cents, the return would be positive if (a) 5% of all booklet purchasers learned how to crochet and produced an average of 30 hats per year; or (b) 10% of all purchasers learned how to crochet and produced an average of four hats per year, or (c) 20% of all purchasers learned how to crochet and produced about two hats per year. Since the LDTC study estimated that over 20% of all purchasers learned how to crochet through reading the book, then we can be fairly sure that the return is high. The cost of the booklet per successful learner would be M 2.50. The retail value of one hat (M 2.00) less the cost of wool (15 cents) less the pro-rated cost of a crochet hook (two cents per hat) would be M 1.83. If only two hats are produced per year by each successful learner, then the return would be 46%.

Table 8

LESOTHO DISTANCE TEACHING CENTER

ESTIMATED SOCIAL RATE OF RETURN FOR CROCHET BOOKLET

% of booklet buyers who learn how to crochet	Cost of booklet per learner	Rate of Return per Booklet Based on Average Number of Hats Produced per Learner in One Year 1/							
		2 Hats		4 Hats		10 Hats		20 Hats	
		Profit or Loss per Learner	% Return	Profit or Loss per Learner	% Return	Profit or Loss per Learner	% Return	Profit or Loss per Learner	% Return
1% learners	M 50.00	M -46.34	-93	M -42.68	-85	M -31.70	-63	M -13.40	-27
5% learners	10.00	- 6.34	-64	- 2.68	-27	- 8.30	83	26.60	266
10% learners	5.00	- 1.34	-27	2.32	46	13.30	266	31.60	632
20% learners	2.50	1.16	46	4.72	188	15.80	632	34.10	1,364
30% learners	1.67	1.99	119	5.65	338	16.67	996	34.93	2,092
(Net income to learners not including booklet cost)		(3.66)		(7.32)		(18.30)		(36.60)	

1/ Assumptions: Hat is produced and sold by learner for M2.00, cost of wool is M0.15, cost of hook is M0.40 and it lasts for 20 hats;
Opportunity cost of learner's time is 0;
Net income per hat (not including booklet) is M1.83

Source: LDTC estimates
Date: November 20, 1980

-276-

3.22 The results of its research have encouraged the LDTC, which is now completing an advanced crochet booklet to assist women in using new stitches and in crocheting more complex items such as dresses. The LDTC is also completing a booklet on cattle diseases and a new cookery booklet which will attempt to overcome the problems of the earlier booklet by providing recipes for locally available nutritious foods rather than concentrating on donated foods. Another booklet, "Watching Your Baby Grow," will provide information on child care from the ages of three months to nine months. LDTC will also do another study on preferences for new bookets to establish its priorities for new publications. Clearly the booklet program is one of the LDTC's major successes.

Radio Programs for Adults

3.23 In 1974 the LDTC initiated radio programs in junior certificate English, Mathematics and Sesotho, and senior certificate mathematics, as well as a program to provide student advice. These programs were all directed to private candidates. An LDTC survey in 1976 found that only 20% of the private candidates listened to the programs. Since only about 400 students were enrolled as private candidates, this seemed a very inefficient use of radio time, especially since audience surveys suggested that the general public had only minimal interest in the programs. Since that time the LDTC has moved away from programs directed solely to private candidates towards "open broadcasts» aimed at both the private candidates and the general public.

3.24 At present the LDTC broadcasts three programs. "Human and Social Biology" is a 30 minute program on health and personal hygiene. While the program is based on the senior certificate syllabus, it is designed to appeal to a larger audience. The first 15 minutes discuss a particular subject and

the second fifteen minutes discuss what ordinary people would like to know through interviews and dramatized dialogue. The program is produced in three days by one person, who checks with professionals to ensure that his material is appropriate. The "Sesotho Language" program has been on the air since 1976 and is the most popular LDTC program. It is based on the junior certificate syllabus, but is designed to appeal to a wider audience. The program focuses on traditions and language of the Basotho people. A radio survey showed that 20% of those with radios listened to the program and most remembered its content. A recently initiated program on "National Development" is designed to assist rural people to understand how they can improve their social and economic conditions. The program describes current news in the rural areas, and includes discussions of handicrafts, home management, food and nutrition, and where and how to get assistance from local authorities.

3.25 The radio department includes a staff of three--a broadcasting officer, a radio producer, and a studio technician--as well as a small radio studio. Overall about 130 programs per year are broadcast. Table 9 shows that the estimated cost of the radio group in 1980 was about M 28,500 and the cost per hour in 1980 was about M 220. These costs are very low compared to most commercial radio stations.

3.26 Despite a lack of evaluation information, the open radio broadcasts seem to be a cost-effective way of utilizing the LDTC's limited resources. The programs will be able to reach an even larger audience, with the prospective increase of Radio Lesotho's power to 200 kw. However, as in the case of the newspaper supplement, the producers must spend most of their time finding usable material to meet tight schedules. It might be appropriate, therefore, to reduce the number of programs broadcast and to strengthen the quality of the remaining programs. This would involve establishing long-term sequential objectives as well as appropriate research and feedback.

Table 9

LESOTHO DISTANCE TEACHING CENTER

COST OF RADIO PROGRAMS, 1980

Number of hours produced per week	2.5 hours
Number of hours per year	130 hours
Cost of radio group	M28,500
Cost per hour	M 220

Source: LDTC
Date: November 20, 1980

Table 10

LESOTHO DISTANCE TEACHING CENTER
COST OF RESEARCH ON CHILD NEEDS
PREPARED FOR UNICEF

	Cost
Field Work	
3 staff members for 20 days at M 15 per day	M 900
4 staff members for 10 days at M 10 per day	600
Transport 4,000 km @ 30 cents per km	1,200
Computer time	1,000
Analysis	1,400
Report Writing	200
Questionnaire Design	100
Questionnaire Printing	100
TOTAL	M5,550

Source: LDTC estimates
Date: November 20, 1980

The Research Department

3.27 Since 1975, the Research Department of the LDTC has prepared about 30 research reports. Some of these reports have been very critical of LDTC programs. For instance, the 1976 report found that only 20% of the LDTC private candidates were listening to the junior certificate programs, and another 1976 report found that few people read the LDTC "cookery" booklet and fewer still tried out some of the recipes.

3.28 The research division has developed simple, inexpensive methodologies, designed to provide useful information at a fairly low cost. Often 50 or fewer people are interviewed. The Department is now involved in a larger scale survey of nutrition, health, and education needs of pre-school children, prepared for UNICEF, in which it is interviewing 700 people. The total cost of this survey is about M 5500 (Table 10). Adding the value of technical assistance, which is provided free by bilateral agencies, would raise the cost to about M 10,000 to 12,000, which is also very low for the large scale of the research. However, this particular piece of research undertaken as part of the LDTC's service agency concept has meant that the Research Department has not had the resources to evaluate the LDTC programs such as the radio and newspaper supplement programs.

3.29 The research department consists only of one director, two research officers, and two field workers. One technical assistance specialist has replaced the director, who is on study leave. The total budget was M 10,500 in 1979 or 4.5% of the LDTC's operating budget. With this limited staff it is essential to concentrate efforts on key research problem areas (see below).

Programs to Assist Other Non-Formal Education Agencies

3.30 Since its establishment the LDTC has assisted other agencies. However, in 1977 it decided to establish a specific role as a service agency. In

1979-80 the LDTC assisted the Health Education Unit in the Ministry of Health to prepare no-smoking posters. The LDTC produced posters for the Family Planning Association, and printed various manuals and newsletters for other agencies. The research unit of LDTC administered a questionnaire for UNICEF on the needs of children and women in rural Lesotho for improved health, sanitation, nutrition, and pre-school education. Earlier, in 1977 the LDTC prepared a handbook, a newsletter and radio announcements for a rural development project in Thabia Bosiu. LDTC is now preparing a booklet for seamstresses for Basuto Enterprise Development Corporation. In order to expand the service agency concept, the LDTC is doing a survey of all existing non-formal education institutions in Lesotho, as a means of getting better linkages with other organizations as well as getting a better idea of needs. LDTC charges full cost for its direct operations but does not charge for overhead. In 1979-80 about 14% of its budget, or M 33,000, went to support its service agency role.

3.31 Based on its experience since 1977, the LDTC has found that its personnel need to spend much time assisting agencies to determine their specific needs and objectives, which at first are usually too vague for appropriate action by LDTC. In addition, the LDTC has found that many agencies lack the financial, professional and technical capacity to have an impact on rural Lesotho, despite very ambitious mandates. In the case of the Thabia Bosiu project LDTC prepared booklets which remained in warehouses for lack of funds for distribution. In the non-smoking campaign there was little follow-up and many posters were not properly displayed. Since LDTC does not charge overhead, its assistance has drained its finances as well as its staff. In particular, the research department has been unable to evaluate the LDTC radio and newspaper supplement program because all its efforts have been going into the UNICEF Survey.

IV. EVALUATION OF THE LDTC

4.01 Since 1974 the LDTC has initiated a series of experiments designed to measure how best to achieve its goals of improving the life of Basotho youth and adults. The LDTC has had some clear successes. The private secondary student program has had higher pass rates than regular school students. The in-service teacher training program continues to have high participation and pass rates. The LDTC booklets have sold well and research has shown that the "How to Crochet" booklet has assisted many Basotho women to learn how to crochet. While the early experiments in closed broadcasting to private candidates as well as literacy programs have been unsucessesful, the newspaper supplement and open broadcasting are promising new endeavors. The LDTC has performed far better than other agencies with similar mandates. The three main reasons for LDTC's success are its autonomy, its dedication to its mandate, and its tradition of self-criticism.

4.02 As an autonomous agency, the LDTC functions in part like a private company. For instance, it reserves funds to replace worn out equipment and weights its budget away from salaries (only one-third of its budget) and towards equipment, travel, and production. Unlike the AIS of the Ministry of Agriculture, it is not dependent on the government to determine line items and therefore if its budget were cut it would be able to make its own decisions on which line items to expand or contract.

4.03 In addition, unlike a government agency, the LDTC emphasizes "selling its product" — i.e. its services, its printed materials and its programs to achieve its goals of improving the life of the rural propulation. If people are not reading and using its booklets or listening to its radio programs,

LDTC is willing to revise or even drop them. This interest in results and effects at the grass roots is in contrast to other public agencies. For instance, the National Radio Station has never done a listener survey, and continues to publish a broadcast program which is three years out of date. In the same way the IAS of the Ministry of Agriculture focuses on the number of leaflets and booklets produced but has no information on the use which is made of its printed materials. The objective of the recently produced IAS film was to provide official information on Ministry of Agriculture activities, but not apparently to change attitudes or behavior of rural farmers.

4.04 The third key to LDTC's success is its willingness to criticize its own work. As noted above, the research department has written reports which have effectively ended the LDTC's broadcasts to private candidates as well as several basic literacy programs. The small research group is efficient and effective, uses sound research methodology, and has the support of top LDTC officials.

4.05 The LDTC is not without its problems and difficulties. Based on a review of its programs, the LDTC appears to be focusing on four key areas: improving the economic situation of the Basotho, improving health, strengthening Sesotho language and culture, and helping private candidates to get secondary level and teacher training credentials. However, LDTC has never established long-term operational goals for these four areas which might enable it to focus and coordinate its programs directed towards meeting these common goals. In addition each of the three departments of "literacy numeracy", "basic rural education", and "radio programming" has operated separately. To enable the LDTC to focus on its objectives, these three departments could be combined under a single assistant responsible for non-formal education who could assign personnel as needed to the various media programs.

4.06 The LDTC also appears to be dispersing its efforts excessively. For instance, the research group has been so pre-occupied with carrying out outside surveys that it has not had time to initiate reviews of the newspaper and radio programs. The service agency concept, with outside funding, has also been growing rapidly and diverting resources from other activities. While all the objectives of all its programs are worthy, the LDTC would do well to examine its entire set of programs, reduce or eliminate some, and expand others. As an example, the LDTC might consider producing fewer but better researched radio programs or expanding preparation and production of "how to do it" booklets directly related to economic production such as those on basic accounting or marketing or handicrafts. In its service agency role the LDTC might propose "learning packages" in areas such as formative evaluation, goal setting, and basic accounting, which, after preparation, would require less input from LDTC staff. It might also consider dropping its basic literacy and numeracy programs, which (except for the prisons experience) have had the least success among its programs. Overall the LDTC should not undertake new obligations without the assurance of adequate long-term human and financial resources.

4.07 Despite these problems, the LDTC is doing better than most other public and private agencies in Lesotho and is meeting its goals, albeit in a modest way, of improving the economic and social life of the Basotho. The experience of the LDTC in the use of the print media is particularly impressive and its openness to self-criticism and its ability to change its approaches based on formative evaluation are particularly laudable. Overall, the LDTC offers a valuable model worthy of replication in other developing countries.

World Bank Publications of Related Interest

Alternative Routes to Formal Education: Distance Teaching for School Equivalency

edited by Hilary Perraton

The demand for education is outstripping the capacity of many countries to build schools or to recruit and pay teachers. To meet this demand and to provide access to education to individuals who are unable to attend regular schools, educators throughout the world are trying to develop alternatives to the traditional classroom. One of these alternatives—known as distance teaching—combines correspondence courses with radio or television broadcasts and occasional face-to-face study.

Does this alternative work? Is it cheaper? This book is the first attempt to answer such key questions. It examines the variety of ways in which distance teaching has been used, provides comparisons of specific cases, analyzes their costs, and considers the effectiveness of distance teaching versus traditional education.

The Johns Hopkins University Press. 1982. 344 pages.

LC 82-7233. ISBN 0-8018-2587-3, $35.00 (£26.25) hardcover.

Worker-Peasant Education in the People's Republic of China

Nat J. Colletta

Reviews and analyzes adult education activities in China from the late 1920s to the current time.

World Bank Staff Working Paper No. 527. 1982. 94 pages.

ISBN 0-8213-0050-4. $3.00.

Publishing for Schools: Textbooks and the Less Developed Countries

Peter H. Neumann

World Bank Staff Working Paper No. 398. June 1980. ii + 79 pages (including 2 appendixes).

Stock No. WP-0398. $3.00.

Attacking Rural Poverty: How Non-Formal Education Can Help

Philip H. Coombs and Manzoor Ahmed

Educational efforts outside the formal school system that offer potential for rural development and productivity.

The Johns Hopkins University Press, 1974; 3rd paperback printing, 1980. 310 pages (including 3 appendixes, references, index).

LC 73-19350. ISBN 0-8018-1600-9, $25.00 (£11.00) hardcover; ISBN 0-8018-1601-7, $10.95 (£4.25) paperback.

Spanish: La lucha contra la pobreza rural: el aporte de la educación no formal. *Editorial Tecnos, 1975.*

ISBN 84-309-0559-6, 725 pesetas.

Cost-Benefit Analysis in Education: A Case Study of Kenya

Hans Heinrich Thias and Martin Carnoy

Attempts to measure the benefits of various types of education in monetary terms, and to assess the role of earnings in the demand for and supply of educated people in a country.

The Johns Hopkins University Press, 1972. 208 pages (including 5 annexes, bibliography).

LC 72-187064. ISBN 0-8018-1335-2, $6.95 (£4.25) paperback.

The Economic Evaluation of Vocational Training Programs

Manuel Zymelman

A methodology for appraising the cost effectiveness of alternative methods of industrial training in developing countries.

The Johns Hopkins University Press, 1976. 134 pages (including chart, 3 appendixes, bibliography).

LC 76-4868. ISBN 0-8018-1855-9, $6.00 (£3.50) paperback.

Spanish: Programas de formación profesional: su evaluación económica. *Editorial Tecnos, 1977.*

ISBN 84-309-0747-5, 415 pesetas.

Education

Wadi D. Haddad, coordinating author

Emphasizes the pervasive role of education in development and draws extensively on the Bank's experience in education for two decades and its close collaborative ties with other international agencies, individuals, and institutions of developing countries.

Sector Policy Paper. April 1980. 143 pages (including 19 annexes, map). English, French, Spanish, Japanese, and Arabic.

Stock Nos. PP-8002-E, PP-8002-F, PP-8002-S, PP-8002-J, PP-8002-A. $5.00.

The Educational Use of Mass Media

Gloria Feliciano, Alan Hancock, Gerald Hein, Albert Horley, Janet Jenkins, Wallace Lambert, Hilary Perraton, Takashi Sakamoto, Nelly Sidoti, John Tiffin, and Shigenari Futagami

Deals with the issues that developing country educators and decision-makers encounter when they consider using mass media to further the country's education and development.

World Bank Staff Working Paper No. 491. October 1981. v + 124 pages (including bibliography).

Stock No. WP-0491. $5.00.

The Use of First and Second Languages in Primary Education: Selected Case Studies

Nadine Dutcher

Addresses some areas of concern regarding the appropriate language for initial primary education in multilingual societies. Reviews eight case studies in seven countries in which primary schooling was given either in the second language or in the first and compares achievement in reading and arithmetic. Concludes that the best choice of language must be determined on a case-by-case basis depending on the interrelated characteristics of each situation.

World Bank Staff Working Paper No. 504. January 1982. iii + 62 pages (including annex, references).

Stock No. WP-0504. $3.00.

Education and Basic Human Needs
Abdun Noor

Conceptualizes basic education and examines its ability to help the poor acquire skills that enable them to meet their basic needs. Groups countries into four major categories and suggests policy choices—based on the unique socioeconomic circumstances in each category—that will make basic education universal by the year 2000.

World Bank Staff Working Paper No. 450. April 1981. iv + 64 pages (including 2 annexes).

Stock No. WP-0450. $3.00.

Education and Income
Edited by Timothy King; prepared by Mary Jean Bowman, George Psacharopoulos, Marlaine E. Lockheed, Dean T. Jamison, Lawrence J. Lau, Albert Berry, and Gary S. Fields.

World Bank Staff Working Paper No. 402. July 1980. viii + 315 pages (including appendix, bibliography).

Stock No. WP-0402. $15.00.

Education Programs and Projects: Analytical Techniques, Case Studies, and Exercies
Irving A. Sirken

World Bank (EDI), January 1977; revised edition, 1979. ix + 287 pages. (Available from ILS, 1715 Connecticut Avenue, N.W., Washington, D.C. 20009, U.S.A.) $6.00 paperback.

The Effects of Education on Health
Susan H. Cochrane and others

World Bank Staff Working Paper No. 405. July 1980. 95 pages.

Stock No. WP-0405. $3.00.

The Evaluation of Human Capital in Malawi
Stephen P. Heyneman

World Bank Staff Working Paper No. 420. October 1980. vi + 101 pages (including references, 21 tables, 6 annexes).

Stock No. WP-0420. $5.00.

Farmer Education and Farm Efficiency
Dean T. Jamison and Lawrence J. Lau

This book complements earlier studies by reviewing existing literature on the relation between farmer education and farm efficiency. The authors then are able to confirm these earlier findings—which strongly suggest that the more educated farmers are more productive, particularly where new inputs and methods are available—by using new techniques to examine new data sets from Korea, Malaysia, and Thailand. Price data from Thailand are used to test the effect of education on the ability of a farmer to adjust the prices and composition of his output to the prevailing prices.

The Johns Hopkins University Press, 1982. 310 pages (including bibliography, appendixes, index).

LC 81-47612. ISBN 0-8018-2575-X, $27.50 hardcover.

Higher Education in Developing Countries: A Cost-Benefit Analysis
George Psacharopoulos

World Bank Staff Working Paper No. 440. November 1980. 129 pages (including references, tables).

Stock No. WP–0440. $5.00.

NEW

Mexico's Free Textbooks —Nationalism and the Urgency to Educate
Peter H. Neumann and Maureen A. Cunningham

World Bank Staff Working Paper No. 541. 1982. 148 pages.

ISBN 0-8213-0101-2. $5.00.

Primary Schooling and Economic Development: A Review of the Evidence
Christopher Colclough

World Bank Staff Working Paper No. 399. June 1980. 31 pages (including references, 5 tables).

Stock No. WP-0399. $3.00.

Primary School Participation and Its Internal Distribution in Eastern Africa
Jack van L. Maas and Bert Criel

Examines the distribution of primary school enrollments within and among the countries of the Eastern Africa Region.

World Bank Staff Working Paper No. 511. August 1982. 105 pages.

ISBN 0-8213-0055-5. $5.00.

Public Expenditures on Education and Income Distribution in Colombia
Jean-Pierre Jallade

Examines the allocation of educational benefits among various population groups and considers the distributional effects of taxes that pay for public subsidies in general.

The Johns Hopkins University Press, 1974. 90 pages (including 2 annexes, bibliography).

LC 74-4216. ISBN 0-8018-1628-9, $5.00 (£3.00) paperback.

REPRINTS

The Economics of Higher Education in Developing Countries
George Psacharopoulos

World Bank Reprint Series: Number 225. Reprinted from Comparative Education Review, *vol. 26, no. 2 (June 1982):139-59.*

Stock No. RP-0225. Free of charge.

The Optimal Ability-Education Mix and the Misallocation of Resources within Education: Magnitude for Developing Countries
Sebastian Pinera and Marcelo Selowsky

World Bank Reprint Series: Number 192. Reprinted from Journal of Development Economics, *vol. 8 (1981):111-31.*

Stock No. RP-0192. Free of charge.

Returns to Education: An Updated International Comparison
George Psacharopoulos

World Bank Reprint Series: Number 210. Reprinted from Comparative Education, *vol. 17, no. 3, 1981.*

Stock No. RP-0210. Free of charge.

The Returns to Education: Increasing with Experience or Decreasing with Expansion?
J.B. Knight and R.H. Sabot

World Bank Reprint Series: Number 200. Reprinted from Oxford Bulletin of Economics and Statistics, *vol. 43, no. 1 (February 1981):51-71.*

Stock No. RP-0200. Free of charge.

Adoption of Agricultural Innovations in Developing Countries: A Survey
Gershon Feder, Richard Just, and David Silberman

Reviews various studies that have provided a description of and possible explanation for patterns of innovation adoption in the agricultural sector.

World Bank Staff Working Paper No. 542. 1982. 65 pages.

ISBN 0-8213-0103-9. $3.00.

Agrarian Reform as Unfinished Business—the Selected Papers of Wolf Ladejinsky
Louis J. Walinsky, editor

Studies in agrarian policy and land reform spanning four decades, grouped chronologically according to Ladejinsky's years in Washington, Tokyo, and Vietnam and while at the Ford Foundation and the World Bank.

Oxford University Press, 1977. 614 pages (including appendixes, index).

LC 77-24254. ISBN 0-19-920095-5, $32.50 (£14.95) hardcover; ISBN 0-19-920098-X, $14.95 (£5.25) paperback.

Agrarian Reforms in Developing Rural Economies Characterized by Interlinked Credit and Tenancy Markets
Avishay Braverman and T. N. Srinivasan

World Bank Staff Working Paper No. 433. October 1980. 32 pages (including references).

Stock No. WP-0433. $3.00.

Agricultural Credit

Outlines agricultural credit practices and problems, programs, and policies in developing countries and discusses their implications for World Bank operations.

A World Bank Paper. May 1975. 85 pages (including 14 annex tables). English, French, and Spanish.

Stock Nos. PP-7502-E, PP-7502-F, PP-7502-S. $5.00 paperback.

The Agricultural Economy of Northeast Brazil
Gary P. Kutcher and Pasquale L. Scandizzo

This study, based on an agricultural survey of 8,000 farms, assesses the extent and root causes of pervasive rural poverty in northeast Brazil. The authors review a number of policy and project options; they conclude that courageous land reform is the only effective means of dealing with the problem.

The Johns Hopkins University Press, 1982. 288 pages.

LC 81-47615. ISBN 0-8018-2581-4, $25.00 (£17.50) hardcover.

Agricultural Extension: The Training and Visit System
Daniel Benor and James Q. Harrison

Describes the Training and Visit System of extension developed by Daniel Benor and introduced in a number of projects assisted by the World Bank in developing countries.

May 1977. 55 pages (including annex). English, French, and Spanish.

Stock Nos. PM-7701-E, PM-7701-F, PM-7701-S. $3.00 paperback.

Agricultural Land Settlement
Theodore J. Goering, coordinating author

Examines selected issues related to the World Bank's lending for land settlement, and gives estimates of the global rate of settlement and the world's ultimate potentially arable land.

A World Bank Issues Paper. January 1978. 73 pages (including 4 annexes). English, French, and Spanish.

Stock Nos. PP-7801-E, PP-7801-F, PP-7801-S. $5.00 paperback.

Agricultural Price Management in Egypt
William Cuddihy

World Bank Staff Working Paper No. 388. April 1980. x + 164 pages (including annex, bibliography).

Stock No. WP-0388. $5.00.

Agricultural Price Policies and the Developing Countries
George Tolley, Vinod Thomas, and Chung Ming Wong

This book first considers price policies in Korea, Bangladesh, Thailand, and Venezuela, bringing out the consequences for government cost and revenue, farm income, and producer and consumer welfare. Other effects, including those on agricultural diversification, inflation, economic growth, and the balance of payments are also discussed. The second part of the book provides a methodology for estimating these effects in any country. Operational tools for measuring the effects on producers, consumers, and government are developed and applied.

The Johns Hopkins University Press, 1982. 256 pages.

LC 81-15585. ISBN 0-8018-2704-3, $25.00 (£17.50) hardcover.

Agricultural Project Analysis: Case Studies and Exercises

Case studies and exercises on agricultural project preparation and analysis, developed for, and used in, EDI's rural development and rural credit courses.

World Bank (EDI), 1979. v.1—viii + 711 pages. v.2—iv + 113 pages. v.3—iv + 157 pages. (Available from ILS, 1715 Connecticut Avenue, N.W., Washington, D.C. 20009, U.S.A.)

$9.00 paperback.

Agricultural Research

Points out that developing countries must invest more in agricultural research if they are to meet the needs of their growing populations. States that studies in Brazil, India, Japan, Mexico, and the United States show that agricultural research yields a rate of return that is more than two to three times greater than returns from most alternative investments and cites some of the successes of the high-yielding varieties of rice and

wheat that were developed in the mid-1960s. Discusses the World Bank's plans to expand its lending for agricultural research and extension, particularly for the production of food and other commodities that are of importance to low-income consumers, small farmers, and resource-poor areas.

Sector Policy Paper. June 1981. 110 pages (including annexes). English, French, and Spanish.

Stock No. PP-8101-E, PP-8101-F, PP-8101-S. $5.00 paperback.

A Development Model for the Agricultural Sector of Portugal

Alvin C. Egbert and Hyung M. Kim

Spatial mathematical programming is used to develop comprehensive and quantitative methods to suggest development strategies in Portugal's agriculture sector.

The Johns Hopkins University Press, 1975. 110 pages (including bibliography).

LC 75-26662. ISBN 0-8018-1793-5, $6.50 (£4.00) paperback.

Economic Aspects and Policy Issues in Groundwater Development

Ian Carruthers and Roy Stoner

Examines a wide range of economic and policy issues related to development of groundwater for irrigation.

World Bank Staff Working Paper No. 496. October 1981. 110 pages (including annex, bibliography).

Stock No. WP-0496. $5.00.

NEW

Economic Return to Investment in Irrigation in India

Leslie A. Abbie, James Q. Harrison, and John W. Wall

Reports on an investigation into the efficiency of investment in surface and groundwater irrigation in India.

World Bank Staff Working Paper No. 536. 1982. 52 pages.

ISBN 0-8213-0083-0. $3.00.

Farm Budgets: From Farm Income Analysis to Agricultural Project Analysis

Maxwell L. Brown

Clarifies the relation between simple farm income analysis and the broader field of agricultural project analysis and emphasizes the more practical aspects of project preparation and gives guidance to those responsible for planning in agriculture.

EDI Series in Economic Development. The Johns Hopkins University Press, 1980. 154 pages.

LC 79-3704. ISBN 0-8018-2386-2, $15.00 (£10.50) hardcover; ISBN 8-8018-2387-0, $6.50 (£4.50) paperback.

Spanish: Presupuestos de fincas. *Editorial Tecnos, 1982.*

ISBN 84-309-0886-2, 725 pesetas.

Fishery

Highlights the importance of fisheries to the economies of developing countries and recommends that the World Bank provide assistance to those countries that have the fishery resources and are willing to develop them further.

Sector Policy Paper. December 1982.

ISBN 0-8213-0138-1. $5.00 paperback.

Food Security in Food Deficit Countries

Shlomo Reutlinger and Keith Knapp

World Bank Staff Working Paper No. 393. June 1980. 39 pages (including appendix, references).

Stock No. WP-0393. $3.00.

Forestry

Graham Donaldson, coordinating author

Examines the significance of forests in economic development and concludes that the World Bank should greatly increase its role in forestry development, both as a lender and adviser to governments.

Sector Policy Paper. February 1978. 63 pages (including 7 annexes). English, French, and Spanish.

Stock Nos. PP-7804-E, PP-7804-F, PP-7804-S. $5.00 paperback.

NEW

Improving Irrigated Agriculture: Institutional Reform and the Small Farmer

Daniel W. Bromley

A model of farmer interdependence is developed to provide suggestions for improving existing irrigation systems, as well as for designing new ones.

World Bank Staff Working Paper No. 531. 1982. 96 pages.

ISBN 0-8213-0064-4. $3.00.

NEW

Increasing Agricultural Productivity

(Proceedings of the Third Annual Agricultural Sector Symposium)

Ted J. Davis, editor

These proceedings are the third in a series of records of Agricultural Sector Symposia presented at the World Bank each January since 1980. Contains the papers presented by the speakers, chairpersons' statements, and summaries of the discussions prepared by the rapporteurs.

1982. 307 pages (including index). ISBN 0-8213-0099-7. $15.00.

NEW

India: Demand and Supply Prospects for Agriculture

James Q. Harrison, Jon A. Hitchings, and John W. Wall

Contains four papers that report on the World Bank's economic work in the agricultural sector in India and the implications of this development both for foodgrains and for other major agricultural commodities. Focuses on the demand for agricultural commodities through the year 2000, the foodgrain economy, the vegetable oil economy, and the sugar economy.

World Bank Staff Working Paper No. 500. October 1981. 133 pages (including 5 appendixes, references, annex).

Stock No. WP-0500. $5.00.

Agricultural Research and Productivity
Robert E. Evenson
and Yoav Kislev

Examines the role of scientific research and technological change in increasing agricultural productivity.

Yale University Press, 302 Temple Street, New Haven, Connecticut 06520, U.S.A. 1975. xi + 204 pages (including 10 appendixes, references, index).

LC 74-15210. ISBN 0-300-01815-0, $15.00 hardcover; ISBN 0-300-01877-0, $3.95 paperback.

Spanish: Investigación agrícola y productividad. *Editorial Tecnos, 1976.*

ISBN 84-309-0641-X, 420 pesetas.

Agroindustrial Project Analysis
James E. Austin

Provides and illustrates a framework for analyzing and designing agro-industrial projects.

EDI Series in Economic Development. The Johns Hopkins University Press, 1981. 224 pages (including appendixes, bibliography, and index).

LC 80-550. ISBN 0-8018-2412-5, $16.50 (£10.00) hardcover; ISBN 0-8018-2413-3, $7.50 (£4.25) paperback.

French: L'Analyse des projets agro-industriels. Economica, 1982.

ISBN 2-7178-0480-3. 49 francs.

Spanish: Análisis de proyectos agro-industriales. *Editorial Tecnos, 1981.*

ISBN 84-309-0882-X, 600 pesetas.

Argentina: Country Case Study of Agricultural Prices, Taxes, and Subsidies
Lucio G. Reca

World Bank Staff Working Paper No. 386. April 1980. 72 pages (including 3 annexes).

Stock No. WP-0386. $3.00.

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Edited by Roger D. Norton and Leopoldo Solís M.

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The Johns Hopkins University Press, 1983. 632 pages.

LC 80-29366. ISBN 0-8018-2585-7, $35.00 (£24.50) hardcover.

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Building National Capacity to Develop Water Users' Associations: Experience from the Philippines
Frances F. Korten

Over a five-year period, the National Irrigation Administration (NIA) of the Philippines has been building its capacity to develop water users associations on small-scale irrigation systems. This paper details the changes that have been made within the agency as a result of the development of these associations prior to the construction of the physical system and the involvement of association members in the planning and construction stages. It also examines the nature of the learning process that has led to these changes and discusses the implications for donor support of other small-scale irrigation programs and more generally for programs involving village-level work.

World Bank Staff Working Paper No. 528. July 1982. v + 69 pages (including references).

ISBN 0-8213-0051-2. $3.00.

Casos y Ejercicios Sobre Proyectos Agrícolas
Edited by Orlando T. Espadas

Three case studies prepared in conjunction with the EDI's Agricultural Projects Courses in Spanish and intended primarily for teachers of project analysis.

World Bank (EDI), March 1974; revised January 1975. 480 pages (Available from ILS, 1715 Connecticut Avenue, N.W., Washington, D.C. 20009, U.S.A.)

$5.00 paperback.

The Design of Organizations for Rural Development Projects—a Progress Report
William E. Smith, Francis J. Lethem, and Ben A. Thoolen

World Bank Staff Working Paper No. 375. March 1980. 48 pages. English and French.

Stock No. WP-0375-E, WP-0375-F. $3.00.

The Design of Rural Development: Lessons from Africa
Uma Lele

Analyzes new ways of designing rural development projects to reach large numbers of low-income subsistence populations. The paperback reprinting in 1979 contains a new chapter by the author updating her findings.

The Johns Hopkins University Press, 1975; 3rd printing, 1979. 260 pages (including glossary, appendix, maps, bibliography, index).

ISBN 0-8018-1769-2, $9.95 paperback.

French: Le développement rural: l'expérience Africaine. *Economica, 1977.*
ISBN 2-7178-0006-9, 39 francs.

Land Reform

Examines the characteristics of land reform, its implications for the economies of developing countries, and the major policy options open to the World Bank in this field.

A World Bank Paper. May 1975. 73 pages (including 2 annexes). English, French, and Spanish.

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World Bank Staff Working Paper No. 332. June 1979. vi + 131 pages (including 3 annexes, appendix, map).

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Dennis J. Casley and Denis A. Lury

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The Johns Hopkins University Press. 1982. 145 pages. French and Spanish forthcoming.

LC 82-7126. ISBN 0-8018-2910-0. $8.50 (£6.50) paperback.

Monitoring Rural Development in East Asia
Guido Deboeck and Ronald Ng

World Bank Staff Working Paper No. 439. October 1980. 91 pages (including annexes).

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Sector Policy Paper, February 1975, 89 pages (including 14 annexes). English, French, Spanish, and Arabic.

Stock Nos. PP-7501-E, PP-7501-F, PP-7501-S, PP-7501-A. $5.00 paperback.

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Judith Tendler

This paper describes the Bank's new-style rural development projects, including some of the things that happen in the political environment of a project when governments, assisted by the Bank, redirect their public-sector services and subsidies to the rural poor.

World Bank Staff Working Paper No. 532. 1982. 100 pages.

ISBN 0-8213-0028-8. $3.00.

Sociocultural Aspects of Developing Small-Scale Fisheries: Delivering Services to the Poor
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World Bank Staff Working Paper No. 490. October 1981. iii + 61 pages (including references).

Stock No. WP-0490. $3.00.

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Raj Krishna and G. S. Raychaudhuri

World Bank Staff Working Paper No. 381. April 1980. 62 pages (including 2 appendixes, 6 tables, bibliography).

Stock No. WP-0381. $3.00.

A System of Monitoring and Evaluating Agricultural Extension Projects
Michael M. Cernea and Benjamin J. Tepping

World Bank Staff Working Paper No. 272. December 1977. vi + 115 pages (including 9 annexes, bibliography).

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World Bank Staff Working Paper No. 385. April 1980. ix + 134 pages (including 2 appendixes).

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Michael M. Cernea

World Bank Reprint Series: Number 196. Reprinted from Extension Education and Rural Development, *vol. 2. (1981):221-35, 281.*

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Economic Analysis of Agricultural Projects *Second edition, completely revised and expanded*
J. Price Gittinger

This entirely new edition of the World Bank's best-selling book sets out a careful and practical methodology for analyzing agricultural development projects and for using these analyses to compare proposed investments. It covers what constitutes a "project," what must be considered to identify possible agricultural projects, the life cycle of a project, the strengths and pitfalls of project analysis, and the calculations required to obtain financial and economic project accounts.

In the ten years since its publication, the first edition has been accepted widely as a standard reference and text. The methodology reflects the best of contemporary practice in government agencies and international development institutions concerned with investing in agriculture and is accessible to a broad readership of agricultural planners, engineers, and analysts.

This revision adds a wealth of recent project data; expanded treatment of farm budgets and the efficiency prices used to calculate the effects of an investment on national income; a glossary of technical terms; expanded appendixes on preparing an agricultural project report and using discounting tables; and an expanded, completely annotated bibliography.

EDI Series in Economic Development.

The Johns Hopkins University Press. July 1982. 528 pages (including appendixes and glossary/index).

LC 82-15262. ISBN 0-8018-2912-7, $37.50 (£22.50) hardcover; ISBN 0-8018-2913-5, $13.50 (£8.75) paperback.

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Headquarters:
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RCA 248423 WORLDBK
Cable address: INTBAFRAD
WASHINGTONDC